THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

Publishing Office, No. 42 Pine Street.

Devoted to the Interests of Illumination, Heating, Ventilation and Sanitary Improvement, Domestic Economy, and General Science.

VOLUME XVII.—No. 9.) WHOLE No. 308. } NEW YORK, SATURDAY, NOVEMBER 2, 1872. {$3 PER ANNUM IN ADVANCE.

Reynold's Turbine.

We herewith present to our readers an illustration, with description of this wheel. The wheel without case, consists of a short cylinder supporting a hub for the shaft; blades nearly radial and plane, projecting from the circumference of the cylinder, form the surface upon which the water impinges; a circular disk attached to each end of the cylinder and edges of the blades, plane except the swell for the issues, confines the water, and with the cylinder and blades, forms the body of the wheel, which is cast whole. The swell for the openings to discharge the water commences in the disk, on that side of the blade against which the water is directed, near the cylinder, and enlarges both in the axial and radial directions, to a point near the plane of the next blade, where it forms a curved opening, large towards the cylinder, and small towards the circumference of the wheel; and which discharges the water in a direction opposite to that in which it approaches the wheel. To conform strictly to theory, neither disk nor issues should present a plane surface, but convenience, economy and strength warrant the form above described; as it gives a near approximation to the maximum effect of one made in a more perfect form, while the wheel may be cast whole, and can be made of great strength, without the aid of bolts or bench work.

In order to apply the water, this wheel is placed in a circumferential scroll case, which lays on the water tangentially and concentrically. This circumfluent application of the water allows large openings to be used, and favors a low velocity of the issuing water, as the centrifugal force holds the water to its work and retards the discharge.

By a proper adjustment of the spout, issues, scroll and motion of the wheel, the water reaches "the wheel without shock, and leaves it without motion," as nearly as is consistent with a free flow of the water.

The water leaves this turbine with a velocity nearly equal to the velocity of the wheel at the point of discharge, advantage being taken of the centrifugal force to increase the velocity of the discharge towards the circumference, as much as the velocity of the wheel is greater at the same point. At the same time the volume of discharge at each point may be equalized, by a proper adaptation of the form of the issue.

The motion of the wheel is slow and steady; an increase of the velocity reduces the quantity of water, and a decrease of velocity increases the quantity, giving the wheel great self-regulating capacity.

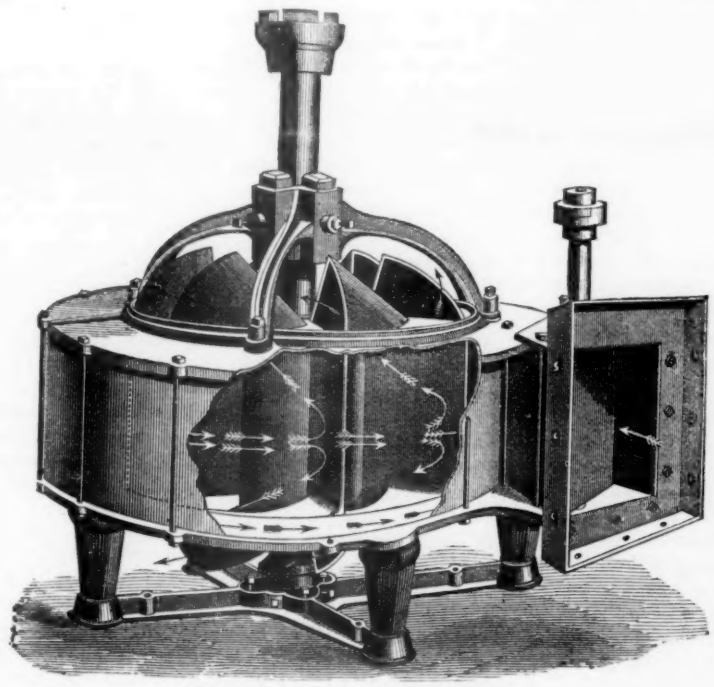
It excels all other wheels in simplicity, strength and durability; and while presenting no points upon which obstructions can lodge, it yields a very high per cent. of effect.

It is placed and neatly fitted in an iron scroll case, with iron spout and gate. The case is supported by an iron frame, fitted with an adjustable step. The step, one length of shaft, coupling and gate are furnished with each wheel. The whole is well made and finished and put together ready for use, and forms one of the most compact, portable, convenient and economical water wheels ever offered to the public. It can be transported at little expense, and put into a mill and set in motion by any person of the least mechanical intelligence.

This wheel has issues both on its upper and lower side, discharging the water both up and down, which not only secures the free escape of the water, but greatly relieves the weight on the foot step. The action of the water does not, indeed, add anything to the weight on the step. The friction on it is, therefore, very light; the power is applied with the simplest gearing, and thus very little of the useful effect of the water is lost by friction. This turbine, with the ordinary finish, utilizes from 80 to 90 per cent. of the power of the water, according to circumstances. Numerous and careful experiments have been made to ascertain and determine both the quantity of water it will use and the per cent of power it will give.

Those making inquiries or ordering wheels, should state particularly the head and fall, the quantity of water they have at low water, and the effective power they desire, or the kind and quantity of machinery they expect to propel, and the direction the wheel is to run.

Further information can be had on application to GEORGE TALLCOT, 96 Liberty street, New York.



REYNOLD'S TURBINE.

The Dangers of Fire-Proofing.

Metallic roofs are currently regarded as affording excellent safegurrds against fire, and, indeed, the insurance companies think so highly of their efficiency as to lessen the rates of insurance upon metallic-roofed buildings. Nevertbeless, the metallic roof calls for the plumber with his charcoal furnace, and the plumber so frequently upsets the furnace, and thereby sets the roof on fire, so as to make it a question whether the metallic roof, complicated with the inevitable plumber, is not really more dangerous than the wooden roof without a plumber. Recently, Canterbury Cathedral and a palace in Mexico were set on fire on the same day by the plumber, who had carried his furnace on the roof, and subsequently kicked it over. Had each of these incendiary plumbers been provided with a pail of water, he could have extinguished the fire he had kindled, and it would; therefore, be a wise measure to compel the plumber to supplement his charcoal furnace with some portable means of counteracting its fiery tendencies.—*N. Y. Times.*

Chemical Repertory.

No. 79.—November 2, 1872.
EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

501. Shaping Soft Rubber with a File.—President Morton, of the Stevens Institute, tells us that he finds the ordinary thick sheet rubber used in making up lantern tanks and for many similar purposes, may be readily dressed into exact shape *with a file*, if only it is supported by being clamped between plates of wood or metal in the vice. The file is used dry, and in all respects as in working on wood or metal.

502. To Cut and Bore India Rubber Stoppers.—Dip the knife, or cork borer, in solution of caustic potash or soda. The strength is of very little consequence, but it should not be weaker than the ordinary reagent solution. Alcohol is generally recommended, and it works well until it evaporates, which is generally long before the cork is cut or bored through, and more has to be applied; water acts just as well as alcohol, ahd lasts longer. When, however, a tolerably sharp knife is moistened with soda lye, it goes through india rubber quite as easily as through common cork; and the same may be said of a cork borer, of whatever size. I have frequently bored inch holes in large caoutchouc stoppers, perfectly smooth and cylindrical, by this method. In order to finish the hole without the usual contraction of its diameter, the stopper should be held firmly against a flat surface of common cork till the borer passes into the latter.—*W. F. Donkin, in Chemical News.*

503. Sewer Gases.—In a small work (for sale by Van Nostrand) Prof. O. Reynolds, of Owens College, Manchester, suggests a plan for preventing the evil of the back flow of gas into our houses. Of this plan he has had four years' experience; and has, without exception, found it to answer perfectly. Prof. Reynolds is not aware that this complete scheme has ever been suggested before; but it embodies as its principal features several plans which are daily growing in favor; among which, perhaps, the most important is that of having a break or trough in the pipe which connects the house with the sewer. This has now been advocated for several years, though the name of its first proposer seems to be unknown.—*Mechanics' Magazine.*

504. Transparency of Mountain Air.—Astronomical observations should be made from high elevations. Prof. Young reports the whole number of lines in the chromosphere of the sun, seen from Sherman, a lofty station on the Rocky Mountains, as 150, which is three times as great a number as have been observed from near the sea level. In these localities the atmosphere is clearer, steadier, and it is owing to this fact that a star has been recognized at these high altitudes as having a companion or being a double star, not previously known as such. An observer on the Pacific Coast reports to Prof. Peirce that he can see the companion of the star Polaris frem a high point on the Sierra Nevada. It is well known that this is a test of great nicety, requiring the utmost purity of atmosphere. Telescopes will hereafter be placed higher than ever before—in Europe, probably on the Alps.

505. Cement for Aquaria.—The trouble with red lead and oil is, that it is apt not always to adhere to the glass. Probably the best cement is that which consists of three parts of powdered pipe clay, one part oxide of iron, and as much linseed varnish as is sufficient to make a stiff paste; or the so-called stone cement—nine parts of pipe clay, one of litharge, and so much linseed oil as to be of proper consistency. This becomes as hard as iron, and adheres with great tenacity to glass or almost any other substance.—*Journal Applied Chemistry.*

506. Photographic Device.—In a certain garden in London, there is a beautiful statue of black marble, which had been repeatedly brought under the "eye" of the camera, but always without pictorial success, on account of the close proximity of one or two trees and a brick house, which were only 20 feet behind the statue, and which invariably appeared in the picture with a most unbecoming and undesirable degree of prominence. Having been consulted by the proprietor, we suggested that the offensive brick building might be excluded from the view presented to the camera, either by placing a large background of uniform color behind it, or, still more readily, by burning a quantity of damp hay between the statue and the house, the smoke from which would obliterate the details of the latter. This advice was promptly acted upon; and the wind being in a favorable direction—that is, blowing from the direction of the camera towards the statue—three heaps of litter were quickly raked together and ignited, these being placed in a line about ten feet behind the statue and a few feet apart. A plate was now exposed, and, so fantastical had been the gyrations of the smoke and so well had it played its part that, when the photographer developed the picture, the statue stood out in excellent, nay brilliant, definition on a background upon which neither trees or brick edifice were visible. The success of the experiment was most complete.—*British Journal of Photography.*

507. Spectral Analysis of the Zodiacal Light.—M. Respighi has made known to the Academy certain observations which prove that the spectrum of the Zodiacal light is not continuous, and presents many bright bands. He also cites observations which confirm those of Angstrom made in 1867, tending to show the identity of the aurora borealis and the Zodiacal light.—*Les Mondes.*

508. Violet Light on Vegetation.—M. Baudrimont obtains results the reverse of M Poey, and affirms that all the colors without exception are unfavorable to vegetation, and none more so than violet. All plants lighted by it died first; after viblet the most unfavorable was green. Blue, optically situated between them did not give so fatal results.—*Ibid.*

509. Germination of Seeds.—Late experiments appear to establish the fact that while exclusion from the luminous rays of the solar spectrum is necessary to the healthy germination of seeds, yet the chemical or actinic rays are indispensable to that process. These penetrate deeper into the soil than do the luminous rays. The exclusion of the chemical rays and not the absence of oxygen alone is assumed to be the cause of seeds failing to grow when buried too deeply in the earth.—*Prof. Joy.*

510. Colored Spectacles.—The *Scientific American* quotes from a medical authority: "The photographer uses orange colored glass to exclude the actinic rays of light, and why some optician has not had the genius to see that orange is the proper color for spectacles, instead of green or blue, for persons with weak eyes, is beyond my comprehension. A room in the hospital with which I am connected, is lighted through orange colored windows, and is used by patients who have certain diseases of the eyes requiring the exclusion of the actinic rays of light. It has been very satisfactory. Orange is also, I believe, the proper color for bottles containing chemicals affected by light."

511. Shale Oil in Scotland.—The Scottish Mineral Oil and Coal Company, with a capital of £150,000 in shares of £10 each, has been formed to purchase for £25,000, all in fully-paid shares, the North Cobinshaw and Baads estates in Edinburghshire and Lanarkshire. The purchase includes the leases of the lands, containing 2300 acres of mineral, with a going work already thereon, including retorts, mining appliances, workmen's houses, etc., and the privileges of a railway siding from the Caledonian Railway into the works, as well as the benefit of a patent for a new method of extracting oil from the shale. The advantage of the process is that it will admit of inferior shales, now comparatively worthless, being profitably worked. The estimate shows a profit of £600 per week, being equal to 30,000*l.* per annum, or sufficient to pay 30 per cent. on the capital of the company. The rise and rapid development of the mineral oil trade is one of the most remarkable facts in the commerce of this century. Fifteen years ago a few hundred gallons comprised the entire production and consumption of mineral oil all over the world; in 1864 it hed increased to 6,000,000 or 7,000,000 gallons; and last year the quantity exceeded 250,000,000. The consumption is still increasing. The company will commence business with an abundance of mineral, ample plant, and all the elements necessary to secure succes.—*London Mining Journal.*

512. Petroleum Oil in America.—It is computed that the consumption of this oil in the world in 1871 exceeded 6,000,000 barrels; in 1869 it was only 4,800,000, and in 1870, 5,290,000 barrels. The increase in consumption is attributed to the lowering of prices. The rate of consumption must depend upon the price at which the article can be furnished. When the price becomes high, shale oil will compete with petroleum, and also the common olive oil, and rapeseed oil. The result of observations in Pennsylvania shows that wells continue to produce for about three years, and then dry up. The average production of the wells now is under five brrrels a day per well, a great reduction from the original flow of wells. A large amount of territory has recently been discovered, at least 10,000,000 acres. The British Consul at Philadelphia, Mr. Kortwright, states that at the beginning of this year the number of wells drilling in Pennsylvania was 469, and the number throughout the United States, 526. Great economy in the production of petroleum has resulted from the application of cast-iron tubes to the wells, instead of barrels; the oil is thus carried over the various inequalities of surface for three or four miles to the tanks on the railroads, and forced into them by steam engines. The price of transport is thus reduced one-fifth. The gas emitted is also utilised, both for working engines and illuminating purposes. The consul states that the oil regions are 100 miles in length by 30 to 50 in breadth, and the number of wells to be tapped so great that the supply is considered to be sufficient for a century to come at least. The export of petroleum, naphtha, and benzine from the port of Philadelphia to foreign countries in 1871 amounted to nearly 56,000,000 gallons, of the value of $13,257,895.—*Ibid.*

513. Storage of Petroleum.—To lessen damage from fire, and save oil, a correspondent, "H. M. S.," says: Let each floor where it is stored be divided into squares, sloping downward to the center so that, as each barrel bursts, its contents will run to the center, where they will be immediately extinguished and conducted to a place of safety by means of a siphon. That place of safety might be a large tank or cistern even under the ground beneath the fire: but care should be taken that a pipe should lead off the air from the tank as it fills, which air having become explosive, should be passed through a gasometer, to prevent the fire from communicating with the air or gas in the tank. The amount which might be saved in insurance ought to provide the arrangement.—*Scientific American.*

514. Experimental Chemistry.—*Interesting, but not Altogether Novel Results.*—Workmen were lately employed to clean out the grease and paint from the inside of the steam cylinder of one of the large ferry boats of the New Jersey Central Railway Company, opposite this city. For this purpose the piston had been duly removed and three men went down into the cylinder, which is 11 feet deep and 50 inches in diameter, taking with them a pail of benzine (petroleum naphtha) which liquid they used in softening the grease. Suddenly a small snake-like streak of flame started from under the hands of the man nearest the

benzine pail, and the next instant an explosion occurred, and scattered the burning fluid over the persons of the men.

515. King Coal's Tributaries.—The total quantity of coal raised in the world is estimated at 195½ million tons; Europe yielding 85½ per cent. thereof (167¼ millions); America, 13¼ per cent- (27 millions), almost entirely from the United States; Asia and Australasia, two-thirds per cent. (nearly 1½ million).

517. Heat from Impact of Bullets.—According to J. Bollynski, who criticizes Hagenbach's experiments on this subject, the motion of the leaden bullet, if all converted into heat, would be three times the amount sufficient to melt the amount of lead found to be melted by actual experiment, which he explains, as having been actually expended in denting the iron plates used. By using a hard stone target, he was able to melt all the lead by firing the bullets against it.—*Poggendorff's Annalen.*

517. Paving by Gas.—A novel apparatus has lately been tried in Paris, namely a Gas Rammer. As used from time immemorial the rammer is a heavy iron-shod implement which the workman raises about a foot from the ground and allows to drop, as rapidly as he may, successively upon the boulders or blocks to be set. The object of the invention of Mr. Lignier is to save the laborer the severe physical exertion of raising the heavy tool; an exertion producing in time an injurious effect upon the lungs. In the apparatus of M. Lignier the heavy weight is lifted by a small Lenoir gas engine. To the fly-wheel of the engine is connected the rammer of steel, smaller but heavier than the ordinary instrument. The movement of the machine is controlled by the operator; and the rapidity of the operation, according to the inventor, more than counterbalances the greater cost.

518. Another New Gun.—Bessemer, whose name has been given to the steel he manufactures, is engaged in the manufacture of a gun twenty yards long—so it is said. Nothing like it has ever heretofore been imagined or heard of. Its diameter will be 48 inches, and its bore 30 inches. It is expected to discharge a bolt weighing five tons. In order to give sufficisnt impetus to this monster projectile, the load ef powder will be placed in five different chambers. The explosion of the first will start the shot, and as it flashes along the barrel, the other four will be fired successively, each of them giving it fresh force. If this gun is a success, there are few fortifications at present in existence that could resist the destructive power of its enormous projectiles.

[We think that Mr. Bessemer will find that he has been merely reproducing here an old American invention. The "Lyman Accelerating Gun," which was largely experimented with here about ten years since, was identically on this principle.—Ed.]

519. Gas Leakage and Poisoning.—Ziegler.—This memoir, illustrated by a map exhibiting the situation of the houses, gas-mains, service-pipes, syphons, and course of a portion of a street in Hanau, contains a detailed accovnt of a serious leakage of gas from a syphon fitted to an 8-inch main, and the infiltration of that gas through the soil, so that a person sleeping in one of the houses was nearly suffocated, but respiration was restored after several hours by the application of oxygen. Very many years ago a similar case happened at Strasburg, a full record of which has been published by the late Dr. Orfila.—*Chem. News.*

[Other similar cases have not been known of late in British towns.—Ed.]

520. Enameled Cooking Utensils.—Dr. Zinrek has examined the enamel on hollow-ware sold in Berlin, and reports that the enamel on a stew pan made in Belgium contained so much lead that 15 centigrms. of oxide of lead (2¼ grms.) was found dissolved in one liter of vinegar (3 per cent. acetic acid) which had been boiled in it for one hour.—*Amer. Chemist.*

521. Toxical Power of Carbolic Acid.—Bert and Jolyet, of Paris, have undertaken experiments to make out this point. Between 45 and 60 grains will kill a dog of largs size; nor should it be concluded that a man could bear a dose in proportion to his weight compared to that of the dog, as 30 grains of hydrochlorate of morphia have been injected into the jugular vein of a dog without killing him. Of course one fourth of this dose would kill a man. The above mentioned authors state that carbolic acid is a powerful poison, which, very imprudently, is left in the hands of anybody, either in solution or in the solid state. The former is the most dangerous, as some weak solutions for internal use are sold, as well as very strong ones intended for external use. Thus mistakes may easily occur. They find that carbolic acid acts like strychnine on the excitability of the spinal marrow. It increases its sensibility, like strychnine, at first; but it diminishes that sensibility, or completely abolishes it, when the convulsive stage has exhausted the medulla. The phenomena resulting from carbolic acid are said by our authors to be quite similar to those produced by chloroform, chloral, ether, woorara, and the section of a motor nerve.

522. Animal Fats.—Mene has stated to the *Academy of Sciences* that at different ages of life, the same animal species have fats dissimilar in melting and solidifying points, and in density. Also that the melting and solidifying points rise with age, and the density of the fat increases.

523. Nickel Plating.—Prof. Boettger mentions a curious fact that patents have recently been taken out for nickel plating by a process discovered and published by him thirty years ago. He reprints his own article on that subject, published as early as 1843, in Erdmann's *Journal fuer prakt. Chemie*, vol. 80, page 267.

524. Artificial Silica Crystals.—Maschke refers to a paper published some time ago, in which he had attempted to obtain quartz crystals from aqueous solutions of silicic acid, at ordinary pressures, and at both ordinary and elevated temperatures, in which only negative results could be reported. In this series of experiments, attempts were made to obtain crystals after Senarmont's method, in water heated to 200° or 300° and therefore under pressure. Crystals under these circumstances were obtained, but small and evidently consisting of hydrated silicic acid, and with these crystals were numerous granules of silicic acid consisting of two distinct parts, a nucleus and a coating. Tridymite appeared to have formed and over it a coating of minute crystals of hydrated silicic acid, which evidently had formed as the temperature had lowered. His conclusion is that quartz is formed under no circumstances, at ordinary or slightly elevated temperatures, and ordinary pressure, in aqueous solutions.—*Pogg. Annalen.*

526. Class-Room Fireworks.—Faraday used to show the extreme combustibility of iron very strikingly. One of his experiments was to dust fine iron filings through a large copper ring covered with lamp cotton, soaked in alcohol, and set fire to. This produced a very large flame, though by daylight not very visible. The effect produced when the filings fell into it was very fine; the whole flame became intensely luminous as each particle of iron burnt with those brilliant scintillations which are characteristic of its combustion.

526. Daylight Fireworks.—The Japanese have fireworks made expressly to be let off by daylight. A recent festival in Japan, at which a display of these ingenious toys was exhibited, is thus described in the Yokohama *Herald:* "The second day was occupied with exhibitions of the ingenious daylight fireworks, of the manufacture of which the Japanese appear to be sole masters. As usual, these consisted mostly of bombs, which, exploding high in the air, discharged sometimes various colored jets of smoke, and sometimes closely folded packages of wire and paper, which unfolded themselves into parachutes of great bulk and symmetrical design. They were sometimes fish, which swam leisurely through the atmosphere to the ground; or snakes, which writhed themselves away over the tree tops; or great birds, that hovered kite-like and motionless for an incredibly long time. Occasionally they took the shape of cottages, temples, human beings, magnified crests of daimios, trees and flowers—almost anything that a lively imagination could suggest. The smoke figures, however, were the most amusing. One of the most frequently attempted was a cuttle-fish, with a body of thick, fuliginous black, and arms of lighter hues. Of course, the illusion was very brief, the wind not allowing the smoke to remain undisturbed for more than a few seconds; but while it lasted it was perfect."—*Amer. Artisan.*

British Association of Gas Managers, June, 1872.

ON THE COMPARATIVE COST OF PURIFYING GAS BY LIME AND OXIDE OF IRON.

By Mr. R. Fish, of Hornsey.

Mr. President and Gentlemen,—Having been invited to read a paper before you, I beg to draw your attention to a subject which, so far as I know, has never been discussed at these meetings—I mean the comparative cost and advantages of purifying by lime and by oxide of iron, together with the revivification of the latter.

And, although I cannot boast of having charge of very large works, which might lend an air of authority to what I am about to state, I may say with confidence that I have given considerable attention to the subject, and this it is that makes me less reluctant to address you than I otherwise should be.

With reference to lime, I think there is no one but will admit its worth as regards its purifying merits, but the great inconvenience felt by the accumulation of it, and therefore its liability to create a nuisance, together with an increase of cost, have caused the use of oxide of iron to become more general of late years, for it must be borne in mind that what with our Government inspectors, our local boards, and a great number of others, whom we might well term nuisances, it is manifestly to our advantage to reduce any additional nuisance to a minimum, especially as the abatement of it tends to the comfort and convenience of all concerned.

As regards oxide of iron, it is well known that in its fresh state it freely absorbs the sulphuretted hydrogen of foul gas, thus forming the black sulphide of iron: this, when exposed to the atmosphere, deposits its sulphur, and by the absorption of oxygen becomes converted again into oxide of iron. The sulphur which it had before taken in as sulphuretted hydrogen is thus set free among the particles of the oxide, which, by a succession of foulings and revivifications, become so charged and clogged with inert sulphur that the air loses the power to restore it; even then the spent oxide has its value, and my firm conviction is that when the sulphur compounds become more widely known competition for the spent material will further increase its value.

I cannot argue that oxide of iron has no drawbacks, although it is unquestionably cheaper than lime, but in the course of revivification it gives off unpleasant vapors, and the cost of labor for its frequent removal from the purifiers is very considerable; it is to this important matter (namely, the cost of labor in the revivification of oxide, and the reduction of what in some situations might be considered a nuisance arising therefrom) that I am more especially anxious to draw your attention presently.

As to the saving effected by the use of oxide (with a small portion of lime to take up the carbonic acid), I find after taking the labor connected with oxide into consideration, there is from forty to fifty per cent.

in favor of oxide, but few agree as to the exact cost, this varying according to the price of both materials, the consumption of gas, the adaptation of the oxide and lime houses in proximity to the purifiers, and the means adopted for taking out the oxide and refilling the purifiers.

In order that I may explain the matter more clearly, I will give you the precise cost of purification and labor by the two processes which have been used in the works over which I have the charge.

In the year 1868 our consumption was 10,191,000 cubic feet of gas, and we used for purification—

	£	s.	d.
62 tons of lime, at 16s. 3d.....	50	7	6
Labor, cleaning and refilling purifiers.....	5	13	7
	£56	0	9

Average cost per 1,000 cubic feet, 1½d. and ¼.

This sum, I felt, was too much, and should be reduced; and having experienced, as I have already stated, the nuisance arising from foul lime, and being almost prohibited from removing it from the works, I saw the necessity of resorting to the use of oxide of iron and lime, the result of which was as follows:

In 1869, 1870, and 1871, our consumption was 53,267,000 cubic feet of gas, for the purification of which we used—

	£	s.	d.
500 bushels of Hill's oxide, at 1s. 9d.	43	15	0
53 tons of lime, at 16s. 3d.....	43	1	3
Labor, cleaning out purifiers.....	125	16	4
	£212	12	7
Deduct value of spent oxide.....	45	0	0
	£167	12	7

Average cost, ¾d. per 1,000 cubic feet.

The method which I am about to explain has been in use at the Hornsey Gas-Works for more than five months, and is one that I have thought of sufficient importance to obtain "provisional protection" for. The plan adopted is thus—I provide the purifiers with an inlet and an outlet, independent of the inlet and outlet for gas, and each inlet is furnished with a valve, to which is attached a short, open, and somewhat funnel-shaped pipe. Within the mouth of this pipe a nozzle (in connexion with a pipe from an ordinary steam boiler) is inserted, the use of the apparatus being as follows:

When the purifier requires changing, the gas-ways are, of course, closed, and the air-ways opened; a tap is then turned, and steam passes through the nozzle into the purifier. The effect of this is to cause a rapid current of air to pass through the purifier, and permeate the purifying material, then to pass into the outlet, where it is thoroughly diluted with steam, after which it rapidly ascends and mingles with the upper air. Thus by the employment of steam in the manner described there is not only a sufficient current of air induced for a complete revivification of the oxide, but the use of it keeps the purifying material from getting unduly heated, and produces that degree of dampness most suitable for this purifying agent.

The cost of alteration for my four purifiers—as per plan—has been £24, but the price would somewhat vary, according to the distance to the ventilating shaft.

The cost of cleaning out and refilling purifiers, together with the time taken up in preparation for the same, amounts to 10s. each purifier. I have taken out the oxide from the purifier after five complete revivifications, and after more than two million of cubic feet of gas had passed through, and found the material in good order; indeed, I am of opinion it would have answered three times as long without causing any additional back-pressure.

Therefore, assuming that the plan which I now adopt had been in use for the last three years, I should have saved no less a sum than £106; this would make the average a farthing, and supposing a purifier would pass 200,000 or 250,000 cubic feet of gas before requiring cleaning, by the use of the method I propose, there would be a saving of labor to the amount of £2 per million cubic feet in one case, and 2*L* 10s. in the other.

I therefore think you will readily see that, by adopting the process I have suggested, the trifling outlay would soon be repaid, while the general benefits to be derived are both permanent and substantial.

In conclusion, gentlemen, I would simply observe that I had much wished to have gone into other details connected with this matter, but have condensed it as much as possible in order that I may not trespass too much on your valuable time.

Mr. Hodgson Jones—London—asked the writer whether, since the use of steam, he had been less troubled with naphthaline than previously. His reason for asking the question was that at one of the Lyons stations, a process of the revivification of the oxide by means of steam employed, and the result was entirely to do away with naphthaline in the purifiers.

Mr. Barratt asked Mr Fish the cost to him of lime per ton.

Mr. Broadhead—Great Grimsby—said he used lime entirely at his works, and he found that, for the year ending Dec. 31, 1871, they used 254 tons of lime, at a cost of 124*L* 12s., to which must be added for labor 84*L* 16s., making together 209*L* 8s. Deducting—40*L* 0s. 6d.—the value of impure lime sold, the net cost of purifying 48,416,000 cubic feet of gas was therefore 169*L* 7s. 6d., being 0·839d., or a little under 1d. per 1,000 cubic feet.

Mr. Craven—Batley—asked how long it took to revive the oxide in the purifiers by the method suggested. The figures which he had written out as to the cost of purification by lime agreed very nearly with those of Mr. Fish—viz., 1·15d., as against 1¼d. for material and labor. Since he had adopted the combined materials, iron and lime, the cost has been reduced to ¾d. per 1,000 cubic feet of gas.

Mr. Syms—Rochester—said the cost of purification at his works by means of lime only, was in 1870, about 1s. for 30,000 cubic feet of gas.

Mr. Kelsall—Ashton-under-Lyne—said the cost would of course depend largely upon the value of lime in different districts. At his works it was found that, exclusive of the sum received for spent lime, which was comparatively small—only 6d. per ton—the cost, on the average of the year for material and labor was only 0·57d. He doubted whether any one, whether using lime alone or the combined process, could reduce the cost of purification below that.

Mr. Barratt said his make of gas last year was 48,500,000 cubic feet. He purified with lime alone and the cost, including material and labor, was only 12*L* 17s. 6d., which was below 0·50d. per 1,000.

Mr. G. Anderson said he had tried oxide of iron and lime for purification, and would like to make a remark or two on the paper just read. In the first place, oxide of iron would not purify gas as lime would. It only removed one impurity, the sulphuretted hydrogen, with a small portion of ammonia, which those who understood their own interests did not wish to have removed. On the other hand, lime removed both sulphuretted hydrogen and carbonic acid, the two greatest impurities in coal gas, and those which had made the gas managers profession the most difficult. It was very well-known that oxide of iron had only been adopted for purification because of the nuisance occasioned by dry-lime purifiers. That nuisance arose from the anxiety to make good gas without knowing sufficient of the operation. If the lime was removed from dry-lime purifiers the moment it gave a black test by acetate of lead paper a great mistake was committed, because it would continue to do good in the purification of gas for a long time after it ceased to attract the whole of the sulphuretted hydrogen. By the use of lime in a proper manner, having the purifiers large, and allowing the gas to pass through in a very quiescent state, they would not only get rid of the impurities named, but also the the bisulphide of carbon, which at the present moment was perplexing the gas interest of London. Formerly, there were two gas-works in operation in the town of Dover, and the purifying power being largely in excess of the actual requirements, they were enabled to carry on the process as he indicated, the result being that they had sometimes purified to the extent of 30,000 cubic feet of gas per bushel of lime. As to the relative cost of the two materials, every one knew that purification by oxide was far more expensive. Taking the same cubical contents of oxide and lime, the latter would last two or three times longer than the former. Managers ought, therefore, to pause before they abandoned the use of lime in order to adapt themselves to the mushroom notions of the day. He had an opinon that gas purified by oxide of iron did not possess so high an illuminating power as the same gas would have if purified by lime, and he believed it would be found that there was more naphthaline formed in the course of purification. As to the principle of revivification suggested by Mr. Fish, he would only say that if he could succeed in doing it in the purifiers without the necessity for removal, it would be a great economy of labor, and he would accomplish that which had been before attempted, but hitherto unsuccessfully, in London.

Mr. Hunter—Rochdale—said he agreed more with Dr. Odling than with any of the speakers on the present occasion—viz., that they ought to use lime in the first box until it became sulphide of calcium, and to use it still as sulphide of calcium until it became carbonate of lime, allowing the sulphuretted to pass to the next box, and employing oxide of iron in the last box. By the adoption of the oxide of iron process in combination with lime at Rochdale, a saving had been effected of something like 300*L* or 400*L* per annum. They had the oxide material brought to them and taken away, and were allowed the use of it without any cost whatever. With regard to Mr. Kelsall's remark about the cost of lime being only 0·50d. per 1,000 cubic feet he did not think he could compare favorably with him, but there were other circumstances than locality which might influence the matter. In some cases there might be small purifiers, in others an excess of purifying surface.

Mr. Parlby—Aylesbury—remarked that the cost of purifying by oxide must of course depend greatly upon the price put upon that commodity. Since using it he had found the price to vary considerably; some firms supplied it as low as 15s., others as high as 3*L* per ton, and this too not altogether because of the difference of quality. The method of purification would likewise affect the cost; some works used more lime than oxide, others more oxide than lime to purify the same quantity of gas, and where this was the case there was sure to be some disparity as to the result. In his works he used oxide and lime in the usual manner; but, taking the report of the referees and the observations of Dr. Odling, it appeared to him that there was a great deal to be done before the process of purificatien was perfect. The cost of purification by lime alone at his works was ¾d. per cubic foot; by the use of oxide and lime combined the cost was reduced to ½d., and he hoped still further to economize the expense.

Mr. Hardick—Salisbury—said he had frequently visited the Bath works, where a somewhat similar process of revivification of the oxide was adopted by the manager, and from his own knowledge the oxide material in the purifiers had not been changed for six months.

Mr. Wood—Hastings—said he had manufactured his own oxide for the last four or five years very successfully by dissolving up the old iron of the works with sulphuric acid, using the sulphate of iron in a liquid form with sawdust, which made a very active oxide. It had never cost him more than 8¼d., and seldom more than 7d. per bushel.

Mr. Warner called attention to the importance of keeping the purifying apparatus on longer; it was better for the gas itself, and was much more economical.

Mr. Eldridge—Richmond—said he had recently visited Mr. Fish's works, and was much pleased with what he saw there of the practical application of his system. It was a generally recognized fact that the great drawback to the use of the oxide process was the expense of emptying and charging the purifiers by the revivifying of the spent material. When at Mr. Fish's works he saw the gas tested in a dirty purifier, and found it was very foul, and on the cover of the purifier being removed the oxide was perfectly black. Mr. Fish then applied his method of revivification, and on visiting the purifier four or five days afterwards he ascertained that it was most successful, and that there had been a thorough reviving of the material. He felt that this was a matter worth the consideration of every gas manager, and that they were all under great obligations to Mr. Fish for his simple contrivance. It appeared to him that the oxide was as clean as when the purifier was first charged.

Mr. Fish said he would endeavor to reply to the questions in the order in which they had been put to him.

Mr. H. Jones asked whether there had been any

dimunition in the amount of naphthaline since the adoption of this process. He was happy to assure tnat gentleman and the meeting generally that in the last six years, during which he had represented the Hornsey Gas Company, he had never seen a teacupful of naphthaline in any of the vessels. As to the cost of lime—at Hornsey it was very dear, averaging 16s. 3d. per ton delivered on the works. With reference to the time taken up in revivifying the oxide, Mr. Eldridge had kindly spoken on that point, and he could also bear out his statements that those purifiers, 12 feet square, and containing 10 tons of oxide, were effectually revivified in 4 hours. The operation might have been completed in three and one-half hours. In one of his purifiers gas was turned in on the 1st. of Jan. last, and up to the 1st of June inst. 8,882,000 feet of gas had passed through it without the purifying material being once removed.

The President thought there was one matter in his paper which Mr. Fish had overlooked, and which, as it came under his—the President's—cognizance officially, he would state—viz., that the amount of sulphur compounds in the gas at Hornsey amounted to no more than 15 grains per 100 cubic feet. With reference to the process under discussion, he had seen it in operation, and had a very high opinion of its efficiency. It certainly effected a great saving of labor, and revived the oxide in much less time than it could be done by any method with which he was acquainted. In speaking of the various methods of purification adopted by London engineers, he—the President must express his deep regret that Mr. Anderson had indulged so much in personal remarks on the present occasion, because those remarks were quite uncalled for, and their use only tended to throw discredit upon the association before they were uttered It was a very painful matter to be compelled to speak thus, but his position as President forbade that he should allow the remarks referred to to pass unchallenged.

The Kitchen Range vs. Gas Stoves.

If Satan himself, said the New York *Express*, during one of the terrible heass of the summer, had put his wits to work this hot weather to give city mankind a foretaste of his infernal regions, he could not have constructed a machine more diabolical than the kitchen range, filled with red hot anthracite coal, in a block of city houses, to roast cits therewith. Think of it! you who have not only one red hot kitchen range to roast you, but two, on each side of your house, one from your neighbor's kitchen on the right, and the other from the other neighbor's kitchen on the left! There are thus three fires to open their blazes upon you, when the thermometer is near the hundreds—and while the salamander cook can stand it, the dwellers above and the sleepers in the chambers, where the fiery flues go, feverishly flit about by day, and groan in heated agony all night.

Cannot some American genius supplant Satan in this diabolical invention for cooking? In other climates, where, bless fortune, there is no anthracite coal, and where wood, weighed by the pound, costs something, all the cooking is done—and as well done as we do it, if not better—with a fiftieth part of the fuel we use; and so in the cooler climates of Europe, where charcoal is used, or bituminous coal, which is not "red hot" like the anthracite. Are Americans only born to be roasted in summer fires of the kitchen? Is it the glorious privilege of our country to use fifty pounds of fuel to cook with when other nations use but one? Wake up, Yankee inventor, and invent or discover for us something to save us poor summer cits from being carbonized these hot days, or from melting away into grease! The kitchen range will do, as conducted in winter, when the thermometer is down to zero, but never, never in such summer weather as we have been having for twenty days past.

Genius solved this problem long ago by the invention of the gas stove. For summer use, in cities, nothing can be more convenient or economical. Placed upon the kitchen table, you can broil your steak or chicken in the most admirable manner, boil your coffee, roast your potatoes, bake your buiscuits, fry your cakes and heat your flat irons. The range fire with its overpowering heat is rendered quite unnecessary. People who make complaints ought to look a trifle boyond their noses before they cry out. People who make the loudest complaints are apt to be those who have not looked beyond their noses.—*Scientific American.*

Detection and Estimation of Paraffine in Stearine Candles.

By M. Hock.

Makers of stearine candles mix paraffine with the fatty mass in quantities up to 20 per cent. Paraffine candle makers also mix stearic acid with their paraffine and attribute valuable properties to such a mixture, so far as candle-making is concerned. The attempt to determine if paraffine be present, and if so, to get some approximate idea of the quantity, in a sample of stearine and *vice versa*, by means of the comparison of the melting point and specific gravity of such a mixture, is shewn to be useless, as these vary according to the source from which the paraffine is obtained, as also in the case of the stearic acid, since the pure commercial article is by no means a chemically pure article.

A good method for detecting the presence of stearic acid in paraffine has been devised by R. Wagner, viz. by treating a boiling solution of the paraffine in alcohol with an alcoholic solution of neutral acetate of lead, when, if stearic acid be present, a dense flocculer precipitate appears, but none if it be absent. The best method, and one which can be used quantitatively as well as qualitatively, is described as follows:

Not less than five grams of the candle are taken and treated with warm solution of hydrate of potash, which must not be too concentrated. A soap is formed with the stearic acid, whilst the paraffine is left unaltered. Salt is thrown into the solution, whereby the soap is separated out as a soda soap, and in precipitating takes down the paraffine with it. The soap obtained is thrown on the filter and washed with cold water or very dilute spirits of wine. Thus, firstly, the salt is washed out, and finally, the soap is brought into solution and likewise washed through the filter, leaving the paraffine, which is then dried at a temperture below 35° C. so as not to fuse it. The paraffine is then treated on the filter with ether, and after repeated washing with this solvent, the ethereal solution is carefully evaporated in a weighed porcelain crucible, in the water-bath, at a low temperature. The residue, consisting of the paraffine, is then weighed, and the stearic acid is estimated by difference.—*Am. Jour. Pharm., from Drug. Circular.*

Gas-Holder Building.

T. F. Rowland, of Green Point, who, in addition to iron work of great magnitude, produces the entire plant for gas works, is now building two telescopic gas-holders for the Union Gas-light Company of New York, at Ninety-eighth street, east of First avenue. In each of these, the lower part or section 101 feet 6 inches in diametes; the upper 100 feet. The sections are 26 feet high. The columns and guide-frames are of wrought-iron. He is also building a holder for the Nassau Gas-light Company of Brooklyn, near the Chrome Steel-works, Hughes street and Wythe avenue. The dimensions are the same as those of the holders for the Union Company, except that the height of the sections each is 25 feet. The excavation for this gas-holder has been accompanied with some difficulty, owing to the quicksand character of the soil, and pumping apparatus running with, we should estimate, twenty-five or thirty horse-power, were required to remove the quicksand, water, etc. Another holder is under way by the same firm for gas works at Lawrence, Mass., 120 feet in diameter, and with sections 30 feet each in height. This will hold the enormous quantity of 333,645 cubic feet of gas.

To continue our list, Nashua. N. H., has one ordered, not telescopic, however, of the following size: Diameter, 80 feet; height, 21 feet 3 inches. Lonsdale, R. I., is to have a small telescopic one of 60 feet diameter of lower section and 50 feet for the upper. the height of each section 20 feet. Dorchester, Mass., is to have one, lower section 81 feet and one-half, and upper 80 feet in diameter, each 21 feet 3 inches. Of these, we do not understand that all are actually in process of going up, although some of them are, and all are booked for construction as soon as possible. Among those now being riveted and set up is still another at Perth Amboy, N. J. This is a single section 45 feet by 16, which is also the size of the one designed for erection at South Manchester, N. H. Penn Yan, Pa., is to have a similar one 40 feet by 12. Even Salt Lake city refuses to do without light, and and has ordered a gasometer, one section, 60 feet by 21½. Rowland furnishes for this, as for many of the others, the entire plant of the works. The wrought-iron columns are a specialty with this firm in the building of gas-holders, and their merits and peculiarities of structure may call for some remark hereafter.—*Amer. Artisan.*

The Gas Well at Painsville, Ohio.

To the Editor of the Scientific American:

Having recently spent a few days at Painsville, Ohio, I visited the celebrated gas well of Gen. J. S. Casement, located on the farm of the Hon. C. C. Jennings, about one mile from the city.

Our party, in charge of Mr. Daniel Casement, brother of the General, arrived at the place just as the lamps were being lighted, and were most cordially received by Mr. Jennings, to whom we made known the object of our visit. We were shown into the sitting room, and were soon seated around one of the fireplaces common to many primitive western homes. Before us was, to all appearances, a small wood fire. Upon inspection, however, our wood proved to be imitation logs, made of metal, and our fuel, gas. By the turning of a small stop cock at the side of the fireplace, our genial fire became a roaring flame, making it almost uncomfortable for us in the farthest part of the room. We next proceeded to the kitchen, where we found that all the cooking was done by the same agency, the gas being introduced into the range, and consumed through peculiarly constructed burners. These burners are arranged in six parallel lines, about one inch apart, and cover about two-thirds of the fire plate. The form of the burners resembles the argand in construction. Passing from the old to the new house (which, by the way, though unfinished, is considered to be one of the most complete structures of the kind in the State, and we doubt not, in the West), we here found nearly all of the rooms arranged to be heated by steam and containing also fire places and firelogs. We now descended to the basement to inspect the furnace. The burners used here are the same as in the range, but greatly multiplied. The roaring of the flames under a full head of gas was awfully grand. After the fire was extinguished, the gas was again turned on, to show us the nature of the article. The smell resembles that of the most refined kerosene oil, yet it is not at all offensive. It has not yet been analyzed, therefore I am unable to state its constituent parts.

As to the origin of the well, Mr. Jennings informs us that he had long been convinced that gas was to be found, and that some two years since operations ware commenced, but were abandoned on account of the flow of water. Soon after, the second attempt was made, upon higher ground, which proved successful. The first fifty feet were through light sand and gravelly soil, and at this depth the soapstone rock was reached. An eight-inch pipe was then sunk, and boring through the rock commenced. At a further depth of 650 feet the vein was reached, and the gas has continued to flow to the present time. No receiver or gasometer is used, but the gas is carried through a three-inch pipe immediately to the house, some 200 feet distant.

To give you some slight idea of the supply furnished, I will mention one fact. During the past winter, it was found necessary to keep large fires in the new house. There were thirteen of these, each consuming about the amount required for 150 of our common burners, and were continually burning niget and day, without any apparent diminution.

A recent scientific test has shown that the pressure of the gas is 40 pounds to the square inch, and it is further estimated that there is sufficient quantity to light the whole city of Cleveland.

There is one remarkable feature in connection with this well, deserving more than passing mention. While all the wells discovered have been more or less troubled with a flow of water, thus requiring pumping, Mr. Jennings states that, from the commencement to the close of the work, there has never been a

drop of water in the well, and the engine used in drilling, and also designed for the purpose of pumping if required, has never been in operation since the well was completed.

[The statement in the last paragraph is a mistake, as it is not uncommon for these gas wells to emit no water, and nothing but gas.—ED.]

Gas-Light on American Steamships.

Messrs. Porter and Co., of Lincoln, are at present engaged in erecting on board the *Celtic*, one of the steamers of the "White Star" line, plying between Liverpool and New York, the necessary apparatus for lighting that vessel with gas. It is intended to supply upwards of 3000 lights, about 30 of which will be kept burning night and day, and the gas employed will be manufactured from oil.

The apparatus consists of three sections—viz., retort-stack, washer, condenser, scrubber, and gasholder, the whole compact enough to be contained, including room for stoking and working, in a space of 1,600 cubic feet, or 22 tons measurement space. The retort-stack has three retorts set over two furnaces, so that either one, two, or three retorts may be worked. The ovens and flues are so arranged as to secure the thorough heating of the whole exposed surfaces of the retorts, which are of peculiar shape, and the lids are provided with diaphragm pendants, so that the oil issuing from the syphon feed-pipes must of necessity be distributed over the heated surface and volatilized instantaneously. The stock is provided with all requisite accessories, chains and pulleys for the dampers, foot and handrail, outlet for gas and draw-off cocks for refuse.

The brick-work is enclosed in cast-iron plates constructed to prevent radiation, and thus economize the heat, and the whole is so arranged that any part of the stack may be inspected, cleaned, or renewed, without interfering with the other parts. The washers, etc., for the purification of the gas after it leaves the retorts, are provided with overflow pipes, so arranged that however heavily the ship may roll, the water is maintained at a uniform level. There are also feed-pipes for a supply of clean water when required. The holder is of novel construction, a combination of holder and tank, the usual water-tank being inadmissible on board ship; and this was one of the greatest difficulties that had to be surmounted. The holder passes so completely into the tank when empty, as to leave no waste space for gas which cannot be expelled, and, when full, holds double the quantity of gas usually contained in one of the ordinary construction—an important consideration on board ship, where every inch of space is valuable. Ready access is given to the interior, and all danger from explosion or unpleasant odor from leakage is avoided. An indicator is provided, by which the man in charge can ascertain in a moment the quantity of gas in the holder, and regulate the supply of oil to the retorts accordingly. On leaving the holder the gas passes through a governor, which regulates the flow, so as to give an uniform pressure at the burners, whether few or many are lighted. This regulator, and also the gasholder just described, are so constructed as not to be affected by the motion of the ship. Every precaution is taken against the possibility of danger from explosion; each section is insulated by iron bulkheads, and even every portion of each section is completely isolated by shut-off and bye-pass valves, so that any one or more of them may be thrown out of use for inspection or cleaning without interfering with the workings of the other parts.

The gas produced is pure and brilliant; a jet burning 1½ to 2 cubic feet per hour giving a light equal to 11 or 12 wax candles.

There are between 30 and 40 of these burners in the large saloon of the steamer, which will thus be as brilliantly lighted as any London ball room. The character of the workmanship more resembles a piece of first-rate mechanism than an ordinary gas apparatus, while the convenience and comfort of this method of lighting ships at sea are so marked that its very general adoption may be confidently anticipated.—*English Paper.*

The Rubies (?) of Arizona and New Mexico.

[Dr. Lawrence Smith, at the late meeting of the American Association, gave currency and authority to the hypothesis that the supposed gems from these regions, though not diamonds, were probably white or colorless sapphires, only less valuable than diamonds. The result of this, if believed, would be unfortunate, as only slightly mitigating the mania which will doubtless prove so calamitous in any case to many men. The following item is of great value, as throwing a reasonable shadow of doubt over the whole wretched business.—ED.]

In a recent letter from Tucson to the San Diego (Cal.) *Union*, Gov. A. K. P. Safford of Nevada writes:

"A year and a half ago I learned to a certainty that diamonds had been found either in Arizona or near the line. The information I received was confidential, and I knew it to be true. I with three others then commenced the work of finding the place. We followed rumors, winks, and nods, with about as much earnestness as Japhet looked for his father. Finally, on the Navajoe Reservation, we thought we had found it; but as rubies were much more easily obtained than diamonds, we contented ourselves with gathering rubies. We collected the value of a million or two each, and concluded we had enough to make ourselves comfortable and our friends also. We took them to San Francisco and sent them to Boston. They proved to be garnets, and of no value; and the beautiful dreams of schools and colleges we would build up, and poor people we would make happy, all vanished, and we found ourselves as before, struggling to make the ends meet."

Effects of High Atmospheric Pressure.

During the latter part of June, reports upon the East River Bridge were published. To us the most interesting portions are those which speak of the effects of compressed air on the workmen in the caisson.

"These were not so serious as first anticipated. The few cases of death that occurred could in but two instances be charged to the effects of the pressure. As the latter increased, the working hours below were gradually reduced from four hours to two hours twice a day, at thirty-five pounds. It is true that scarcely any man escaped without being somewhat affected by intense pain in his limbs or bones, or by a temporary paralysis of arms and legs, but they all got over it, either by suffering for a few days outside or by applying the heroic mode of returning into the caisson at once, as soon as the pains manifested themselves. The shortening of the hours of labor produced the best results in keeping the men in good condition, but even this was not necessary for all constitutions, because some could remain below with impunity for six hours at the highest pressure. After the locks were passed the men had their choice of coming up either by an elevator or by circular stairs. During the Winter months all tendency to congestion of the lungs, owing to the sudden change of temperature in coming out of the locks, was controlled by means of steam-coils in the latter, so arranged as to warm the air when coming out of the lock and to cool it when passing in.

"The general condition of the air below was very pure, due to the absence of candles, and illumination by gas alone. Mr. Collingwood found that as the pressure increased the gas burners gave more light, and at thirty-five pounds a one-foot burner gave as much light as a four-foot burner outside. We therefore had a maximum production of light with a minimum production of irrespirable gases."

Coal Discoveries in California.

[From the San Francisco *Bulletin*, Sep. 3.]

Coal veins have been discovered on the foothills, about six miles on an air line from the City Hall of Oakland. Recent developments show that the deposits are extensive, the veins near the surface having a thickness of three feet and upward. The nearest veins yet discovered are on the head waters of the San Pablo Creek. The Heuston ranch adjoins the one where the first discoveries were made. This ranch has recently changed hands, and the purchasers have laid open a large vein of coal on this property. The coal appears to be of much better quality than the average of that taken from the Monte Diablo mines. It is clear and bright, burns freely, and is so free from sulphur that iron may be welded with it without difficulty. It is proposed to run a tunnel for a roadway, through the foothills, near the dam of the Contra Costa Water Company. A tunnel of 500 or 600 feet would admit of a grade easy enough for horses to trot up and down, and for heavy loads to be taken over it. The mines would not be more than six to six and a half miles by this road from the center of Oakland.

We understand that several enterprising citizens of San Francisco are interested in these new mines, and that in a short time this coal will find its way to market. The estimated cost of laying it down in Oakland is about $4.50 per ton, and perhaps a fraction more to bring it to this side of the bay. Adding a fair profit, it looks very much as if Oakland would, at no distant day, obtain a very good quality of coal for $5 a ton, which is less than half the price they are now paying for the poorest quality. Coose Bay coal is retailed on that side of the bay for $14 a ton, and West Hartley at $20 a ton. The coal recently discovered appears from the samples to be very close to the quality of Coose Bay coal. If the new coal measures are as important as many believe, a narrow gauge railroad will probably be constructed from the mines to the tide-water at Oakland. Two or three of the business men of that city, in conjunction with others, have for more than a year past been developing an extensive coal mine at Coose Bay, and are now about ready to bring the coal to this city.

The prices of foreign coal have had an upward tendency for more than a year past, and now that the prices have gone up materially in England, there is no immediate prospect that foreign coals will be any cheaper in this market. We hope some day to see coal for steam purposes laid down in this market at $5 a ton, and for domestic use at from $8 to $10. But it is useless to expect to obtain foreign coals at such figures. The encouraging fact is that hardly a week passes in which some progress has not been made in the matter of coal discoveries on this coast. Two or three capitalists of this city own a tract of land in Mendocino county, of about 25,000 acres. The tract was purchased at about the price of an ordinary sheep ranch, and is worth all it cost if devoted to such uses. But upon this it is now known that there are inexhaustible deposits of coal, of a quality not inferior to English cannel coal. These undeveloped coal fields are about twenty miles from the town of Ukiah, and perhaps thirty-five miles from the coast, and hardly more than 150 miles in a straight line from San Francisco. In the southern part of California extensive coal measures have been discovered within the last eighteen months. These await the advent of railroads to make them accessible, although some of them are near enough to the coast to admit of transportation to tide water by very short roads. On the whole, while coals are dear enough in this market just now, there is good prospect that out of all these discoveries and others to be made, we shall obtain the advantage of an abundance of good coal from home fields, at prices which will make us quite indifferent to the prices charged for imported coal.

Coal in Alaska.

We were yesterday shown, in the office of William Burling, a prominent broker on California street, a sample of coal obtained from a new mine recently discovered in Alaska. The specimen shown us is of the purest anthracite coal, of remarkable hardness and purity. It burns readily and brilliantly.

The coal was brought to the city a few days ago by a German, the captain of a coasting schooner. The coal-beds from which the specimens were obtained are situated several miles inland, according to the captain's story. There are vast banks of it, which come

clear to the surface, and all that is necessary is to send up a force of men and begin cutting. Some Indians brought him a pure piece of coal, and went with him to the place where he got the specimens. He was surprised to see vast banks of coal on the surface, and to all appearances there was no limit to the extent of the beds. He immediately took steps to secure the title to the mine, and obtained some specimens of the coal, which he brought with him to this city, to submit to experts for their opinion. He first showed his specimens to Mr. Burling, who immediately became impressed with the importance of the discovery and secured an interest in the mine. The captain sailed for Alaska a few days ago, and will soon return with a load of the coal. If his reports are verified, on his return a force of men will immediately be set to work to develop the mine. Experienced persons say that the coal, if it is all of as fine quality as that brought to the city, is worth $20 per ton, at the lowest estimate. We understand it is only a few miles from a good harbor, it is easily accessible, and can be brought to this city for about $5 per ton. If these reports prove true, the discovery is one of great importance, and is scarcely surpassed by the reports concerning the recent discovery of diamonds, which have been creating such an excitement in this city.—*San Francisco Chronicle, Aug. 6th.*

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

Accuracy of Gas Meters.

New York, October 24, 1872.

Mr. Editor: Believing that anything relating to the accuracy of gas meters, which will in any way tend to render those instruments more acceptable to the general public, will be of interest to your readers, and as some of your correspondents last year raised such a furore relative to myself, as daring to question the fact, I take pleasure in submitting the following statements relating thereto, in order to again contest for, and endorse my original remarks.

In the month of April, 1871, a new meter bearing the *State Inspector's badge*, was placed in the Gilsey House in this city, and was in use for fourteen months when it was taken out and a meter from another company substituted. The proprietors of the hotel consulted me, when, seeing the great discrepancy between the two meters (50 per cent.), placed the matter in my hands, to treat with the Manhattan Gas Company, relating to the above facts: three months after they showed a certificate from the State Inspector admitting their meter to be *six p. c. fast*, for which the company refunded $400. Now I would be glad to be informed how this meter got six per cent. fast in fourteen months; and if it got six per cent. fast in one year, might it not get 12 per cent. in two years, and 24 per cent. fast in four years. I will add, the situation of the meter was as favorable for perfect registration as possibly could be, the temperature never going below 60° Fahr. Respectfully yours,

John Keeling.

The Weather Waste of Coal.

Terre Haute, Ind., October 22, 1871.

Mr. Editor: In your last issue (October 2) there is another letter from Samuel Shipman, Esq., on "The Weather Waste of Coal," and as he very properly wishes "to know you know," suppose he tests the matter himself. Let him use a certain amount of coal—say enough to run all the retorts he has in use (I judge he is running a small works) for twenty-four hours, with coal directly from the mine, which he certainly can do; let him place the same amount out exposed to the weather for say four months, then let him put the same quantity under cover, with exposure to a free circulation of air for the same period, and he will not only obtain results which will be satisfactory to himself, but he can further aid the cause of science by giving them to the gas world, through your admirable Journal. By this means he will prove that he is really in earnest in his enquiry, and at the same time aid his brethren in the profession.

Being a president of a gas company, he can take the responsibility which some superintendents might not wish to do, of leaving the coal exposed to the weather for the period named. Yours respectfully, R.

Removol of Tarry Incrustations.

Huntingdon, Pa., September 19, 1872.

Mr. Editor: We have a gas-holder that has been (improperly) coated from time to time with gas tar. What could be applied to remove the hardened tar from the iron? If the information sought will interest the readers of the Gas-Light Journal, please answer through its columns. Respectfully,

J. Simpson Africa.
President Huntingdon Gas Co.

[For a note in reply, see editorial page.]

Petroleum in Alsace.

The value of Alsace to Germany and the consequent extent of the loss to France, commercially considered, are alike enhanced by the probable development of a large petroleum industry in that celebrated province. Oil works on a small scale already exist in the valley of the Rhine, near the village of Schwatwiller, within and on the borders of the forest of Hagenau. A thick alluvial deposit has first to be penetrated, beneath which are alternating strata of indurated clay and micaceous sandstone, with seams of compatced sand. These last named seams contain the petroleum, and are found at a depth of 70 or 80 yards. Indications of the presence of petroleum are observable in various parts of the forest, and bitumen is found and worked in the adjacent country. Borings to test the presence of the petroliferous sand have been multiplied to some extent, and in all cases with satisfactory results. The mode of working very much resembles that of a colliery, only on a much smaller scale. We believe that at present there are only two oil pits existing, and one of these is of very recent date. In fact the whole affair is in its infancy, but is most likely destined to undergo very great extension, so as to become of considerable importance. The pits are sunk in the ordinary way, and the seams of sand are worked by means of galleries, in a manner similar to that of getting coal. As the workmen cut their way through the compacted sand, the oil oozes out of it, running down the walls of the gallery on the floor, where it accumulates in shallow wells dug for the purpose. From these wells the crude petroleum is conveyed to the surface to be properly treated. But this process of draining does not remove all the oil, and the sand itself is accordingly taken to the surface to be be distilled in retorts. The crude oil which oozes from the sides of the gallery, and that which is distilled from the sand, are subsequently rectified by a further distillatory process, and the product is understood to be in no degree inferior to the best American petroleum. In working the existing pits, it is a singular fact that no water is met with. Of the extent to which the petroliferous sand prevails, it would be premature at present to judge, but there seems no reason to doubt its presence over a considerable range of ground. Now that attention has been drawn to the subject, we may expect further discoveries will be made. It is reported that Mr. Keate, the well known analytical chemist, has recently visited the oil producing district in Alsace, and examined the works. So far as we can learn, there is every prospect of the oil proving abundant. The cost of production, it would seem, is so moderate, that the competition of American oil need not be feared, and the demand is such that Alsace will consume all she raises for some time to come, unless the produce is very largely increased.

It has been said that petroleum, as found in different parts of the world, is not confined to any particular stratum, and that consequently there is no such thing as a "petroleum rock," properly so called. Petroleum has been found in rocks of all ages, from the lower Silurian to the Tertiary period inclusive. The oil wells of the United States are for the most part sunk in the sandstones which form the summit of the Devonian series. The oil of Alsace, it will be observed, is limited to certain seams of compacted sand, and it would appear that in this region the oil is found solely in these seams. It is a general theory, with regard to the origin of petroleum, that it has been produced by the slow distillation, at low temperatures, of coal and other bituminous minerals. The theory would seem to accord with the fact, already named, that bitumen in various forms is found in the country bordering on the oil regions of Alsace. Further explorations in this territory may lead to still more important discoveries, and the commercial importance of the inquiry is one guarantee that it will not be neglected.—*Engineer.*

The Lumiferous Ether.

Though compelled to think of space as unbounded, there is no mental necissity to compel us to think of it either as filled or as empty; whether it is filled or empty must be decided by experiment and observation. That it is not entirely void, the starry heavens declare, but the question still remains: Are the stars themselves hung in vacuo? Are the vast regions which surround them, and across which their light is propagated, absolutely empty? A century ago the answer to this question would be: "No, for particles of light are incessantly shot through space." The reply of modern science is also negative, but on a somewhat different ground. In support of the conclusion that the celestial spaces are occupied by matter, it is able to offer proofs almost as cogent as those which can be adduced for the existence of an atmosphere round the earth.

The notion of this medium must not be considered as a vague or fanciful conception on the part of scientific men. Of its reality, most of them are as convinced as they are of the existence of the sun and moon. The luminiferous ether has definite mechanical properties. It is almost infinitely more attenuated than any known gas, but its properties are those of a solid rather than of a gas. It resembles jelly rather than air. A body thus constituted may have its boundaries; but, although the ether may not be co-extensive with space, we at all events know that it extends as far as the most distant visible stars. In fact it is the vehicle of their light, and without it they could not be seen. This all pervading substance takes up their molecular tremors, and conveys them with inconceivable rapidity to our organs of vision. It is the transported shiver of bodies countless millions of miles distant, which translates itself in human consciousness into the splendor of the firmament at night.

If the ether have a boundary, masses of ponderable matter might be conceived to exist beyond it, but they could emit no light. Beyond the ether dark suns might burn; there, under proper conditions, combustion might be carried on; fuel might consume unseen, and metals be heated to fusion in invisible fires. A body, moreover, once heated there, would continue forever molten. For, the loss of heat being simply the abstraction of molecular motion by the ether, where this medium is absent no cooling could occur. A sentient being, on approaching a heated body in this region, would be conscious of no augmentation of temperature. The gradations of warmth dependent on the laws of radiation would not exist, and actual contact would first reveal the heat of an extra ethereal sun.—*Tyndall.*

RECENT AMERICAN PATENTS.

Pertaining to the Specialties of this Journal, to date ending October 26, 1862.

129,901.—Process of rendering leather, etc., impervious to gas—E. Osgood.
129,907.—Apparatus for purifying gas.—W. T. Walker.
129,961.—Manufacture of illuminating gas.—G. W. Harris.
130,069.—Non-freezing hydrant.—J. H. Printz.

[*For continuation see page* 100.]

THE AMERICAN

GAS-LIGHT JOURNAL

AND

Chemical Repertory,

PUBLISHED ON THE 2D AND 16TH OF EACH MONTH,

At No. 42 Pine Street, New York.

A. M. CALLENDER & CO.,
PROPRIETORS.

EDITOR---PROF. HENRY WURTZ.
Editor's Private Office, 26 Pine St., Room 36.

This is a recognized official organ of—
LIGHT, HEAT, MINING INTERESTS, STEAM,
WATER-SUPPLY, PATENTED INVENTIONS,
VENTILATION, SANITARY IMPOVEMENT, AND
GENERAL CHEMICAL SCIENCE.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance.

AGENTS:

NEW YORK—AMERICAN NEWS COMPANY, 119 and 121 Nassau St
BOSTON—S. M. PETTENGILL & Co., 6 State Street.
PHILADELPHIA—COE, WETHERILL & Co., Ledger Buildings, Phila.
Germany—B. WESTERMANN & Co., of New York.
Great Britain—TRUBNER & Co., 60 Paternoster Row, London.

☞ All communications to be addressed to "THE EDITOR, No. 42 Pine Street, Room 18, New York.

SATURDAY, NOVEMBER 2, 1872.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 11 and 121 Nassau street, New York agents for this Journal. News dealers will please send orders to them.

NOTICE.

☞ *All Collections for Advertisements, Subscriptions, etc., are made directly from this Office. We have Agents to solicit the same, but they are not authorized to Receipt for Money.*

TO OUR SUBSCRIBERS AND PATRONS.

In making remittances for subscriptions, always procure a draft on New York, or a POST OFFICE MONEY ORDER, if possible. Where neither of these can be procured, send the money, but always in a REGISTERED LETTER. The registration fee has been reduced to fifteen cents, and the registration system has been found by the postal authorities to be virtually an absolute protection against losses by mail. ALL Postmasters are obliged to register letters whenever requested to do so.

CONTENTS.

☞ An asterisk (*) denotes an illustrated article.

*Reynold's Turbine....145
The Dangers of Fire-Proofing....145
Chemical Excerpts....146
British Association of Gas Managers....147
The Kitchen Range vs. Gas Stoves....149
Detection and Estimation of Paraffine in Stearine Candles.149
Gas Holders Building....149
The Gas Wells of Painesville, Ohio....149
Gas Light on American Steamships....150
The Rubies of Arizona and New Mexico....150
Effects of High Atmospheric Pressure....150
Coal Discoveries in California....150
Coal in Alaska....150
CORRESPONDENCE.—
Accuracy of Gas Meters....151
The Waste of Coal....151
Removal of Tarry Incrustations....151
Petroleum in Alsace....151
The Luminiferous Ether....151
Recent Am. Patents....151
EDITORIALS—
Note by the Publisher....152
The Gas Wells of Ohio....152
The Oxygen Illumination in Paris....152
Gas Calorifics: Economy....152
Removal of Tarry Incrustations....153
Geyer's Singing Flame....153

NOTE BY THE PUBLISHER.

As the Editor has been absent during the setting up of the editorial matter this time, and could not revise the proofs, any deficiencies may be held excusable.

THE GAS WELLS OF OHIO.

By favor of Dr. Newberry, we have a copy of an article written by him for the Cleveland *Herald*, which adds numerous facts to our knowledge of the combustible gases pent up in the rocks of Ohio. He first states that the gas-wells now at Erie number *twenty-five*, of which he gives the details of several, as samples, which are used for heating and lighting houses, factories, shops, steam boilers, malt-chambers, etc., etc.

When used in ordinary stoves the stove is partially filled with furnace cinders or broken brick. In open fires it is burned in clay boxes made to represent wood.

Besides the Painesville wells, wells have been bored at Comeant, with entire success. In the Painesville wells the gas is found in the fissures of the "soapstone rock" of the Erie Shales, which latter are 600 to 700 feet thick. In the well at the Erie Seminary, 725 feet deep, a fissure was struck at 300 feet and three more below.

Many attempts have been made, without much success in Cleveland and vicinity, to obtain the gas. There, as elsewhere there are two marked lines of gas and oil springs, connected with the outcrops of two sheets of bituminous shale which underlie the surface. These are the Cleveland shale, of the Lower Carboniferous, 30 to 60 feet thick, and the Huron shale, 300 to 400, black and highly bituminous. One well was bored by the Gas Company at the gas works near the mouth of the river; well head about 15 feet above the lake. This well is 835 feet deep. The rock was reached at 116 feet, the over-lying material being mainly blue clay, with sheets of quick-sand and gravel. The rock passed through consisted of alternations of gray and black shale. Gas was obtained at several points, but not in remunerative quantity.

As the geological formation at Cleveland is precisely the same as at Painesville, Comeaut, and Erie, the difference noticeable in the quantity of gas has excited some surprise. The solution of the problem is, Dr. Newberry thinks, this: As we approach the Alleghanies we find the strata which underlie Eastern Ohio and Western Pennsylvania more disturbed and broken. Successful wells are such as strike fissures. Dr. N. recommends the use of torpedoes, as in the oil wells, to break up the rock and liberate the gas.

The photometric power of the wells of Fredonia and Erie has been found to be 7 or 8 candles, or about the same we ourselves, in a rough experiment, for the West Bloomfield well. He thinks the heating power greater than that of coal gas, and says it contains *carbonic oxide*. If this is founded upon actual analytical results, we should be glad to know of them, as the fact would be new and highly curious. We are not aware of any analysis of natural gases from any locality showing carbonic oxide. Of the wells in Knox Co., Ohio, he says:

"The value of a well producing a copious flow of gas can hardly be overestimated. If the wells of Mr. Neff had been so located that their enormous product could have been utilized, they would have yielded larger pecuniary returns to their owner than any oil well has ever done."

Of a well in Painesville, he says:

"Here every fire in the house, in the kitchen range as well as the parlor grate, is fed by a fuel which gives a brilliant cheerful flame, is supplied and cut-off by turning a stop-cock, makes little smoke and leaves no ashes. And all this in addition to an abundant supply for illumination. So great a luxury as this is, makes doubly fortunate the man who possesses it, and is certainly worth some trouble and expense to those who would enjoy it."

More we would like to extract, but space fails.

THE OXYGEN ILLUMINATION IN PARIS.

As yet we have no authentic information from disinterested sources, about the results of the experiments that have been going on here on the use of oxygen in illumination of cities and public places. We mean with regard to the *economical* and *commercial* success of the plans held for the introduction of this element on a far larger scale than heretofore and raising it from the experimental stage to that of a regular service and supply as an article of consumption to urban populations. A report has however reached our ears, for whose accuracy however we cannot vouch, that an exhaustive investigation is being arranged for, and that Dr. John Torrey, recently returned from his California trip, is to take part therein. We must therefore still suspend all final opinion on the subject.

In the interim, nevertheless it is no less incumbent than appropriate, to put before our readers the latest reports that come from abroad, of the conclusions that seem to have been arrived at there. Through Prof. Joy (in *Jour. Applied Chemistry*) come some brief notes. He says that the city authorities had granted every facility to the Hydro-oxygen Gas Company to put up their burners in the most conspicuous places, and had appointed a committee to inspect them. The company petitioned the authorities for permission to dig up the streets and lay pipe for the introduction of the new system, and upon this petition arose considerable discussion at the session of July 3d, 1872. M. Louvet said that the estimates of cost of the gas had not been confirmed, and during some recent experiments the company had employed a rich illuminating gas instead of a poor quality. He gave an account of public and private experiments, and said that the engineer of M. Tessie du Motay himself admitted that the oxyhydric light was not applicable to public service on account of the complicated apparatus, pressure gauges, etc., required for its manipulation. The success in private was not much more encouraging, and he concluded his report by moving that the request of the company for permission to lay pipes be refused, and that no further commissions be appointed to investigate the matter, as the question ought to be considered as settled. This motion, after full discussion, was nearly unanimously adopted.

We will however throw out at present wishing, as aforesaid, not to pre-judge, the reminder, that experience and history are far from indicating that failure and abandonment, in matters of invention, in Europe always mean failure in America.

GAS—CALORIFICS: ECONOMY.

A passage we find going the rounds, from the Correspondence of a British Journal "the *Echo*" comes in so pat, in connection with, and practical confirmation of, our own expressed views on these topics, that we extract largely:

[Economy in coal having become a necessity when it has reached 35s. a ton, and is certain to

touch £2 (say $10 25 U. S. currency) before Christmas, especially if we have a severe winter, I will give the results of my own experiments during the last six months. For the last five months I have not used one cwt. of coal, and I have had a family of four persons at home, and nearly all the washing and all the ironing has been done at home—the total cost to me having been for the six months, £1 10s. I purchased, at an expense of 4s. 6d., a gas-stove, and have found, that even with one, although I prefer two, I could arrive at the following:

Breakfast was always ready in a quarter of an hour from time of lighting stove, consisting of tea or coffee, and bacon or eggs. The servant was saved the time taken by lighting and cleaning fires and fire-places. All water needed during the day was boiled, and any dinner prepared, with the exception of roast meat, and always two vegetables, or one and pudding. Then for ironing, every one who has used my stove for this purpose say they never had their irons hotter or cleaner. I have known a month's ironing for two ladies and myself done in one day, using this stove. The only thing we could not persuade it to do was to roast meat, and, when we wanted this, we had to send it out to a bake-house, and found it far cheaper than paying for coals.]

As to the *roasting* business, the stoves alluded to must have been unsuitable in construction, as there are plenty of excellent gas-roasters, and these who use them understandingly, consider that no other mode of roasting is comparable therewith, as regards *economy of meat*, as well as of fuel and trouble, and moreover as regards flavor and tenderness of product.

REMOVAL OF TARRY INCRUSTATIONS.

Mr. Africa's inquiry (see Correspondence) involves a practical problem which is doubtless of frequent occurrence, we made a few laboratory experiments, to see whether any of the cheaper agents had sufficient solvent power over the pitchy material to promise its removal advantageously, by other than mechanical means. It would be useless, or at least so tedious as to be impracticable, to operate in the cold. Applied hot, we found that the following agents rapidly softened and dissolved the pitch:

Kerosene oil, oil of turpentine, and lard-oil. Melted lard itself answered as well as the latter, and of these this last was probably the best. Kerosene would be somewhat cheaper, but this, as well as turpentine are not devoid of danger in the handling, when hot. Upon the whole, a broom or mop, dipped in boiling melted lard seems the most practicable means of removing tar incrustations, so far as we experimented.

The heavy distilled oils of coal-tar, if attainable, as they are not generally very readily in this country, would have still greater solvent power. If any of our practical can give practical results of their own trials in this direction, it would doubtless be acceptable to all other readers.

GEYER'S SINGING FLAME.

In our issue of October 2d we called attention to the fact that the new singing flame of Mr. Geyer had been attributed, in an article in the *Scientific American*, to one Dr. Irvine, of Glasgow, our contemporary calling it, in so many words, "Irvine's Singing Flame" and a "new form of singing flame," without the least allusion to Mr. Geyer, the real American discoverer. We feared the error would thus receive an extensive perpetuation. In a recent issue our *confrere* rejoins that ours "is very strange reasoning," and that our "fears are groundless," and, moreover, that it has simply "published * * the matter of record." Our fears *may* be groundless, and we hope they are, but his own reasoning is far stranger than ours, in his attempts to establish his last position. To show this we need but quote a few of the opening sentences in his later article alluded to, (the italics are ours):

"Professor Geyer describes his experiment as an improvement upon the well-known *singing flame of Phillip Barry*, which latter is produced by placing a piece of ordinary wire gauze on the ring of a retort-stand, about four inches above the burner, and lighting the gas above the gauze. At the least noise, this flame roars and sinks down, and acts in a very curious manner."

Now everybody else except our contemporary knows that Barry's flame (which we have shown must be called *Goci's* Sensitive Flame), never was called, and never was a *singing* flame, and that Geyer's discovery consisted, in part, in the very conversion of it into such. We beg to refer our *confrere* in the most fraternal manner, back again to his own "matter of record."

Prof. Henry Wurtz,

Scientific and Practical Chemist and Geologist.

26 PINE STREET, ROOM 36, NEW YORK.

(Office Hours 1 to 4 daily, except Saturdays.)

Geological Explorations and Reports—Chemical Analyses—Advice and Investigations in all the Chemical Arts—Chemical Inventions and Improvements made.

[Prof. W. makes a specialty of GAS CHEMISTRY, and the Analysis of Gas and Coals. Formerly Chemical Examiner in the U. S. Patent Office. Practices as

Patent Agent, Counsel and Adviser

of INVENTORS, in all the CHEMICAL ARTS; for which his great general experience in these Arts, and his special experience inside the Patent Office, have qualified him to an unparalled degree.

Prof. WURTZ is Editor of the AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY, a journal whose circulation and patronage is among classes of the community of the highest position, influence and enterprise; and which furnishes therefore an unequalled medium for communication to the general public of valuable inventions and novel enterprises.

For procuring British and other Foreign Patents promptly, and on moderate terms, Prof. W.'s arrangements are unusually complete and perfect. Inventors may assure themselves of the most *competent*, *diligent* and *faithful* attention to their interests.

GEO. A. McILHENNY'S

PATENT

VACUUM PROCESS,

FOR RELIEVING GAS RETORTS FROM PRESSURE.

This process was patented by Mr. McIlhenny in the United States and Great Britain, in June 1867, and was the first patent for this purpose ever obtained in the United States (but was not presented to the public until its merits were fully tested). It has now been in successful operation for nearly six years, with the most satisfactory results.

The many devices lately brought to the notice of the American public, purporting to accomplish the same results that are claimed for the McIlhenny "Vacuum Process," are mostly old English contrivances that were tried and abandoned years ago, on account of the many difficulties of keeping in working condition the amount of machinery, such as stuffing boxes, valves, levers, etc., necessary to operate them.

But the extraordinary results obtained by the McIlhenny process, have induced some unprincipled persons to bring to the notice of the public, as *recent inventions of their own*, some of these old devices, although none of them pretend to claim that they can in any manner compete with the "McIlhenny Process." But their purpose seems to be simply to evade the McIlhenny patent.

The McIlhenny "Vacuum Process" for relieving Retorts from pressure in the manufacture of Illuminating Gas, is not only safe, simple and effective, but it costs but little to apply it either to old or new works. The only machinery necessary to operate it is a one and a half inch stop cock, and a half inch stop cock to each bench of Retorts. No alteration in the old system is required. In fact, a Works operated with this process, can at any time be operated on the old pressure system, simply by closing the two stop cocks above mentioned. There is nothing about it that can get out of order, nothing that requires special attention; no stuffing-boxes to pack and keep tight, no valves to keep clear of tar and pitch, no levers to lubricate, and no expense for a great amount of machinery.

Those operating their Works with the McIlhenny process, challenge the world to compete with them, as regards the yield and the quality of the gas.

For further particulars apply either to GEO. A. McILHENNY, Engineer of the Washington Gas-Light Co., Washington, D. C., or to WILLIAM YORKE, Engineer of the Portland Gas-Light Co., Portland, Me., who will take pleasure in corresponding with any one feeling interested in the matter, or in showing the operation of the process at their Works.

307-1y

RETORTS AND PIPES FOR SALE.

Three new Iron Retorts, never used. Mouth-pieces, Stand Pipes and Bridge Pipes complete (Sixes) for three Benches of Retorts (Three's). Have remodeled the Works and got in new patterns. Will be sold at half the price of new ones

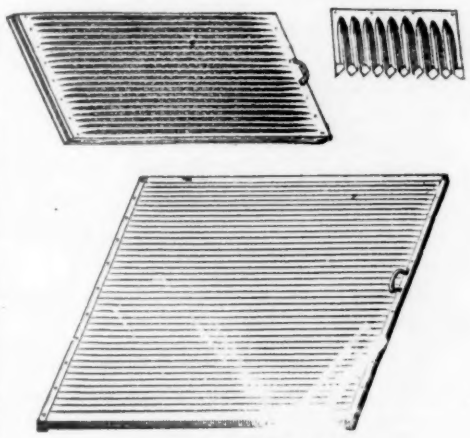
Address W. H. DENNISTON,

307-unl Sup't East End Gas Co., Pittsburgh, Pa.

J. L. Cheesman,

MANUFACTURER OF

Patent Conically and Diamond Slotted Solid Wood Trays.



To Gas Companies.

The above Trays will last longer, and are cheaper than any Tray now used. They are now made without any outside strips, which gives more purifying surface, being perfectly smooth. The lime will not adhere to them as in other Trays. They are now used in over three hundred Gas Companies in the United States, and other places.

JOHN L. CHEESMAN,
151 and 153 Avenue C, New York.

HARTMANN, LAIST & CO.,

MANUFACTURER OF

GLYCERINE for GAS METERS,

53 West Second Street,

CINCINNATI, OHIO.

☞ We are now prepared to furnish Glycerine to Gas Companies, etc., for fillin Meters.
☞ Orders promptly executed. 306-3m

130,052.—Turbine water wheel.—J. O. Joyce.
130,164.—Apparatus for the manufacture of gas.—G. Symes.
130,318.—Gas generator.—S. C. Salesbury.
130,346.—Gas holder.—T. R. White.
130,199.—Gas purifier screen.—E. Duffee.
130,388.—Gas apparatus.—Porter and Lane.
130,458.—Gas retort.—J. C. Tiffany.
130,437.—Manufacture of illuminating gas—E. D. McCracken.
130,555.—Manufacture of illuminating gas.—St. John and Cartwright.
130,381.—Apparatus for generating gas and heating dwellings—T. S. C. Lowe.
130,448.—Turbine water wheel.—G. C. and J. F. Stevens.
130,842.—Gas retort. J. Butler.
130,940.—Automatic gas extinguisher and cut-off.—George R. Pierce.
131,035.—Manufacture of illuminating gas.—W. H. Spencer.
131,157.—Carbureting illuminating gas.—T. M. Fell.
131,240.—Generating gas from petroleum.—A. J. Ambler.
bureter.—F. W. Ofeldt.
131,703.—Gas regulator.—A. H. Phillippi.
131,564.—Machine for charging gas retorts.—T. F. Rowland.

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

[Reported Expressly for this Journal.]

NOVEMBER 2, 1872

DELIVERED IN NEW YORK.

English Cannel.

Ince Hall	$13 50	@	14 00
Kirkless Hall	13 00	@	13 50

English Caking Coals.

Newcastle Gas	$7 50	@	8 00
Liverpool caking	7 25	@	7 50

British Province Coals.

International—At Mines, $2 00 in currency			— —
Block House—At Mines, $1 50, Gold			6 25
Little Glace Bay—At Mines, 1 60 Gold			— —

Pennsylvania Coals.

Penn Gas Coal—At Amboy	$6 75	@	0 00
Westmoreland	6 75	@	0 10
Shafton	6 00	@	0 00
Youghiogheny—At Baltimore	5 50	@	0 00

West Virginia Coals.

MurphyRun	$6 75	@	0 00
Despard	6 75	@	0 00
West Fairmont	6 87½	@	7 00
American Gas Coal	6 62½	@	6 75
Fairmont	6 75	@	0 00
Newburgh Orrel	6 75	@	0 00
Pinnickinick	6 75	@	0 00
Cloverhill of Virginia	5 25	@	5 50
McKenzie Compound Mixture			8 00

American Cannel Coals.

Peytona of West Virginia	$14 00	@	14 50
Darlington of Pennsylvania			— —
American Cannel	$10 00	@	10 00

Asphalts.

Albertite of New Brunswick	$18 00	@	18 00
Ritchie Mineral of West Virginia	17 10	@	00 00
Trinidad Bitumen	— —	@	14 05

Advertisers Index.

☞ In looking for advertisements, see figures 1 to 12, within brackets, at head of advertisement pages.

GAS BURNERS, APPARATUS, ETC.

American Meter Co.—West 22nd st., N. Y., Arch and 22d st., Phil., 23 West st., Boston ... 6
Agency for the Gibson Improvement—W. H. Grenelle, 41 Pine street, N. Y. ... 9
Cast Iron Gas and Water Pipe—Smith & Ellis, York and Meyer streets, Phila., Pa ... 4
Cast Iron Gas and Water Pipes—R. D. Wood & Co., Philadelphia Pa ... 3
Cast Iron Gas and Water Pipe—Henry G. Nichols, 14 Platt street, New York ... 5
Cast Iron Gas and Water Pipe—Jno. McNeal & Sons, 117 Broadway, N. Y ... 2
Gas-Burners—C. Gefroner, 259 Commerce st., Philadelphia, Pa ... 6
Gas Purification—St. John and Cartwright ... 6
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry st., Philadelphia, Pa ... 6
Gasometers, Etc.—Geo. Stacey & Co., Cincinnati, O ... 3
Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway ... 4
Gasholders, Etc.—Delly & Fowler, 39 Laurel st., Philadel ... 4
Gas and Water Pipes—B. S. Benson & Son, Allentown, Pa ... 5
Gasometers, &c.—Keystone Iron Works—2132 Filbert st., Philadelphia ... 4
Gas Screens—American Gas Screen Manufacturing Co., Haverhill, Mass ... 1
Jersey City Gas Meter Works, 14 Morris st., Jersey, N. J ... 3
Northwestern Gas and Water Pipe Co.—646 Wabash Ave., Chicago, Ill ... 7
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y ... 5
Patent Gas Exhauster—Smith & Sayre, 95 Liberty street ... 9
The Gas Light Co. of America—Box 5220, New York city ... 4

GAS COALS.

Despard Coal Co.—Parmelee & Bros., Agents, 52 Pine st., N. Y ... 4
Gas Coals—Bird, Perkins & Job, 86 South st., N. Y ... 5
Grahamite or Ritchie Mineral—27 South Charles street, Baltimore, Md ... 8
Ohio Gas Cannel—George Merryweather, 5½ Pine street, New York ... 3
The Newburg Orrel Coal Company—Chas. W. Hays, Agent in New York, Trinidad Building, 111 B'way, Room 7 ... 5

FOUNDRIES.

Atlantic Dock Iron Works—Hoy, Kennedy & Co., Office 98 Liberty street, N. Y., P. O. Box 2348 ... 3
Cast-Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md ... 6
Continental Works—T. F. Rowland, Greenpoint ... 5
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Sons ... 7
Gloucester Iron Works—J. P. Michellon, Sec., 6 North 7th street, Phila., Pa ... 7
Louisville Pipe Works—Dennis Long, cor. 9th and Water sts., Louisville, Ky ... 7
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman & Wilkins streets, Pittsburg, Pa ... 5
Pascal Iron Works—Morris, Taskar & Co., Philadelphia ... 19
Providence Steam and Gas Pipe Co., Providence, R. I.—H. A. Branch, Agent ... 4

WATER METERS, PUMPS, ETC.

Cast Iron Pipes for Water and Gas—Riley A. Brick, 89 White street, N. Y ... 6
Valves for Water, Steam and Gas—Ludlow Valve Man'g Co., 193 River street, Troy, N.Y ... 5
Water Pipes, etc.—S. Fulton & Co., 412 Walnut st., Phila ... 6

CLAY RETORT WORKS.

B. Kreisher, Clay Retorts, etc., 58 Goerck st., New York ... 8
Clay Retorts, Fire Brick, Tiles, etc.—Wilson & Gardner, Lockport, Westmoreland Co., Pa ... 8
Cheltenham Fire Brick and Clay Retort Works—Evens & Howard, 916 Market street, St. Louis, Mo ... 5
Jersey City Fire Brick Works—J. H. Gautier & Co., Greene Essex and Bergen sts., Morris Canal Basin, N. J ... 8
Laclede Fire Brick Works, 107 North Levee, St. Louis, Mo ... 8
Manhattan Clay Retort Works, 15th st., near Av. C, N. Y ... 8
Philadelphia Fire Brick Works, Vine and 23d sts., Phila ... 8
Retorts, Etc.—Geo. C. Hicks & Co., Baltimore Md ... 6

LAMPS, STOVES, PETROLEUM, ETC.

Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal ... 9

MISCELLANEOUS.

Architect and General Gas Engineer—William Farmer, 111 Broadway Room 91 ... 3
A Synopsis of British Gas Lighting—Jas. R. Smedberg, San Francisco, Cal ... 4
American Journal of Science and Arts—Silliman and Dana, New Haven Conn ... 7
Contractors for Gas Works, Etc.—Murray & Baker, Fort Wayne, Ind ... 5
Fodell's System of Bookeeping—A. M. Callender & Co., 42 Pine st., New York ... 8
Journal of the Franklin Institute—Prof. W. H. Wahl, Franklin Inst., Phila., Pa ... 4
On the Advantages of Gas for Cooking and Heating—Magnus Ohren, Lower Sydenham, London, S. E ... 5
School of Mines, Columbia College, East 49th st ... 5
Scientific and Chemical Expert—Prof. H. Wurtz, 26 Pine street, room 36, N. Y ... 7
Screening Shovels—O. R. Butler, 126 Malden Lane, N. J ... 4
Works upon Gas—D. Van Nostrand, 23 Murray street and 27 Warren street, N. Y ... 9

AMERICAN

GAS SCREEN MAN'F'G COMPANY.

TO GAS-LIGHT COMPANIES.

Your attention is respectfully called to the GAS SCREEN now being manufactured by the American Gas Screen Manufacturing Company, under the patents granted to E. DUFFEE, and are pleased to submit the following points of their excellence and superiority over all other screens now in use.

The Screen is made with an oak frame, interlaced with split rattan, drawn through holes at regular intervals in the Frame and cross-pieces, the edges of the frame being grooved to prevent abrasion.

The advantages of the screen are:

1st. The large purifying surface, the construction of the Screen giving over three-fourths of the surface for the gas to penetrate the lime.

2d. On account of the free passage of the gas through the Screen the pressure is reduced, thereby preventing the accumulating of carbon on the retorts.

3d. The saving of lime and labor, as the Screens are not liable to clog, and are easily cleaned.

4te. Their cheapness and simplicity of construction.

5th. Their DURABILITY—they can be used longer than any other now used.

Testimonials.

PROVIDENCE, RHODE ISLAND, March 21st, 1872

LUTHER DAY, Esq., Agent, etc.

Dear Sir: The Trays manufactured by you for our West Station were put in use in September last, and have *given perfect satisfaction.*

The frames are well put together, and I see no reason why they will not last for a long time. The *very large amount of open space* in these Trays gives the gas an easy passage, and brings it into contact with the lime much better than when the space is so contracted, as is the case in most of the other Trays in use.

The pressure thrown upon the retorts by contracted passages is very great and were gauges used more frequently than they now are in many gas-works, this fact of having *open Trays* would become more apparent to managers of gas works. The difference in pressure at this station in passing the gas through your purifiers, is two-tenths (2-10) inches.

The amount of gas purified, per bushel of lime used to this date, is six thousand five hundred and fifty six (6,556) cubic feet.

Respectfully yours,
JAMES H. ARMINGTON, Supt.

BOSTON GAS-LIGHT CO., Dec. 1871.

Dear Sir: In answer to your inquiry how we like your Patent Tray for dry gas purifiers, I take pleasure in saying we have used them exclusive of all others, for the last three years, and think them far ahead of any yet offered. The surface being nearly three times that of any other Tray, and their lightness and durability perfectly satisfactory.

Yours respectfully,
A. M. GILES.

EDWARD DUFFEE, Esq.

EAST BOSTON, JUNE 15, 1871.

Gentlemen: We have used your Screens some five years. They give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen. Yours truly, A. M. NORTON, Supt.

CHELSEA, May 1, 1871.

Mr. E. DUFFEE.

We are using your Purifying Trays, and find them to be the *best of any* that I have used, and will *purify more gas with less pressure* than any tray that I know. I can fully recommend them, after four years trial, to any Gas Superintendent with perfect safety, as the *cheapest and best Tray made.*

Yours truly, JOHN ANDREW, Sup't.

DORCHESTER, March 3. 1870.

Mr. E. DUFFEE.

Dear Sir: We have had your Gas Trays in constant use for almost one year and six months, and find them superior to any others we have ever used, both in point of economy and efficiency. Truly yours, W. B. BROOKS,
Agent Dorchester Gas-Light Co.

JAMAICA PLAINS, MASS., June 21, 1871.

EDWARD DUFFEE, ESQ.

Dear Sir; The Trays ordered by this company three years ago, are getting somewhat worn. I wish to say here that I consider your Trays to be superior to any yet invented, therefore please make us another set at the price named, to be like the sample shown in every way, and oblige Yours truly
JAMES F. ROGERS,
Sup't Jamaica Plains Gas-Light Co.

BROOKLINE, June 11, 1871.

E. DUFFEE, ESQ.

Dear Sir: You will please make a set of Gas Trays for this company as soon as convenient, at price named. In regard to the merits of the Tray, after having them in constant use for over two years, I will say that I consider them *superior to any Tray* manufactured in this country. Respectfully yours,
H. A. ALLYN,
Sup't Brookline Gas-Light Co.

BANGOR, August 2, 1870.

EDWARD DUFFEE, ESQ.

Dear Sir: Yours of the 20th ult. is received. In regard to your Gas Trays, I take pleasure in saying that they have been in use over two years, and have given perfect satisfaction and they are in good order at the present time; should have no hesitation in recommending them, believing they are the most durable and easiest kept in order of any with which I am acquainted. Respectfully yours,
W. H. PERRY, Sup't.

OFFICE OF THE SPRINGFIELD GAS-LIGHT CO.,
SPRINGFIELD, MASS., Oct. 10, 1871.

Mr. WARD,
President Hartford Gas-Light Co.

Dear Sir: I have been using Gas Screens made by the American Gas Screen Company, for nearly a year, and find them superior in every way to the wooden Screens made and formerly used by the Springfield Gas-Light Co. I can purify more gas with the same quantity of lime, there being more surface to the Screens; and I consider them more durable, and recommend them to your consideration.

Yours with great respect,
GEORGE DWIGHT.

ROXBURY, June 14, 1872.

EDW. DUFFEE, ESQ.

Dear Sir: In answer to your inquiry regarding your Patent Gas Screens, I am happy to be able to say, that after nearly three years constant use we are perfectly satisfied with them being able to purify over fifty pet cent. more gas with them, than with any other Screen we have used.

Yours respectfully,
THOMAS J. PISHOU.

OFFICE DETROIT GAS-LIGHT CO.,
DETROIT, MICH., April 22, 1872.

AMERICAN GAS SCREEN MANUFACTURING CO., HAVERHILL.

Gentlemen: The Screens bought of you work far better than any we have ever used. As a proof, we have with the same quantity of lime purified *twenty per cent.* more gas with your Screens than with any others, and the work well done. The workmen are also better pleased with them—they being light and handy to work. They also relieve the pressure very much upon the retorts, and I cheerfully give you my experience.

Yours truly,
P. E. DEMILL, Secretary.

We give a list of some Gas-Light Companies using them.

Providence, R. I. Gas-Light Co., Boston, Mass. Gas-Light Co.: East Boston, Mass., Gas-Light Co.; South Boston, Mass., Gas-Light Co.; Springfield, Mass., Gas-Light Co.; New Bedford, Mass., Gas-Light Co.; Manchester, N. H., Gas-Light Co.; Reading, Penn., Gas-Light Co.; Biddeford, Me., Gas-Light Co.; Hartford, Conn., Gas-Light Co.: New Haven, Conn., Gas-Light Co.; New Orleans, La., Gas-Light Co.; Savannah, Ga., Gas-Light Co.; Charleston, S. C., Gas-Light Co.; Trenton, N. J., Gas-Light Co.; Charlestown, Mass., Gas-Light Co.; Dorchester, Mass., Gas-Light Co.; Chelsea, Mass., Gas-Light Co.; Baltimore, Md., Gas-Light Co.; Manhattan, N. Y., Gas-Light Co.; Cincinnati, Ohio.; Gas-Light Co.: San Francisco, Cal., Gas-Light Co.: Albany, N. Y., Gas-Light Co.; Sacramento, Cal.; St. Joseph, Mo., Gas-Light Co.; Leavenworth, Kansas, Gas-Light Co.; Macon, Ga., Gas-Light Co.; Roxbury, Mass., Gas-Light Co.; Lansinghburg, N. Y., Gas-Light Co.; Bridgeport, Conn., Gas-Light Co.; Stamford, Conn., Gas-Light Co.; Poughkeepsie, N. Y., Gas-Light Co; Scranton, Penn., Gas-Light Co.; Lewiston, Me., Gas-Light Co., and one hundred others.

Address **A. P. JAQUES, Treas.,**
Amer. Gas Screen Man'f'g Co., Haverhill, Mass.

WILLIAM FARMER,

ARCHITECT AND GENERAL GAS ENGINEER,

111 BROADWAY, TRINITY BUILDING, Room 95, New York.

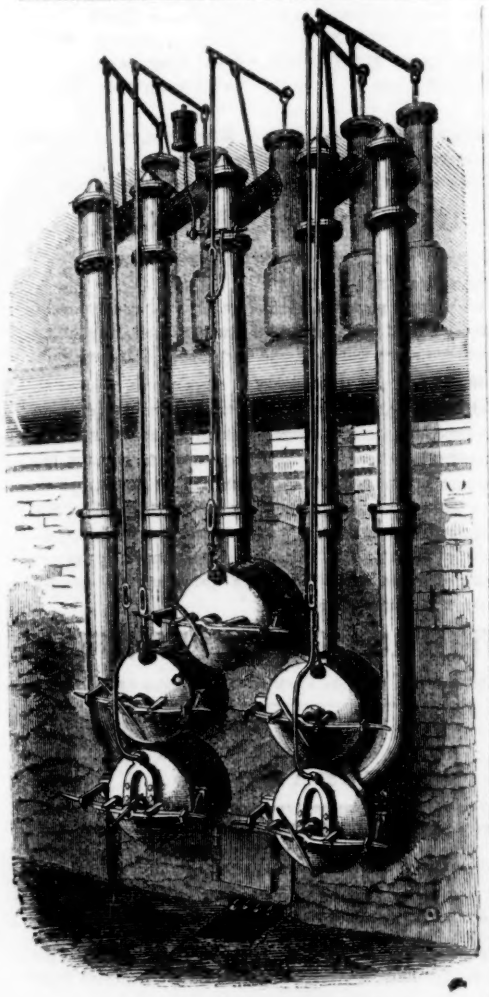
WILLIAM FARMER may be consulted upon all matters connected with the construction of GAS WORKS and other buildings. W furnish Genera and Detail Drawings, Specifications and Estimates for Gas Works of any capacity, Retort Settings, Condensers, Washers, Exhausters, Purifiers, Holders, Coa Hoisting Apparatus, Iron Roofs, and every description of Machinery required in the Manufacturing of Gas.

PATENTEE OF THE FOLLOWING INVENTIONS:

Exhausters for Gas and Foul Lime Ventilation,
Dumping Barrows for Coal, Coke and Lime,
Blowers for Forgers,
Pumps for Water, &c., &c.

REFERENCES:

CHAS. ROOME, President Manhattan Gas-Light Company, N. Y.
SAMUEL DOWN, President American Meter Company, N. Y.
C. VANDERVOORT SMITH, Engineer Manhattan Gas-Light Company, N. Y.
CHARLES MOWTON, Engineer New York Gas-Light Company, N. Y.
SAMUEL P. PARHAM, Engineer Mutual Gas-Light Company, N. Y.
Prof. HENRY WURTZ, Editor AMERICAN GAS-LIGHT JOURNAL.
HENRY J. DAVISON, Engineer, 77 Liberty Street, N. Y.
HERRING & FLOYD, Oregon Iron Foundry, 738 Greenwich Street, N. Y.
FREDERICK SABBATON, Engineer Troy Gas-Light Company, Troy, N. Y.
Col. WHITE, Engineer People's Gas-Light Company, Williamsburgh, N. Y.
GEORGE W. PARSONS, Sup't and Eng'r, Rochester Gas-Light Co., Rochester, N. Y.
GEORGE W. EDGE, Engineer, Jersey City Gas-Light Co., Jersey City, N. J.
J. H. GAUTIER & Co., Fire Brick Works, Jersey City, N. J.
Professor SILLIMAN, New Haven, Conn.
JOHN HARRISON, Engineer People's Gas-Light Company, Baltimore, Md.
CHARLES FABEN, Superintendent and Engineer Toledo Gas-Light Co., Toledo, O.
PETER F. BURTIS, Supt. and Engineer, Chicago Gas-Light Co., Chicago, Ill.
JAMES R. SMEDBERG, Consulting Engineer, San Francisco Gas-Light Co., Cal. [254-



A. F. HAVENS'S
ADJUSTABLE AUTOMATIC DIP-SEAL,
AND
Improved Retort Lids.

The Seal closes automatically, when the retort-lid is removed, and is broken by replacing the lid. No mistake can possibly be made. The rods are adjustable in a moment to any contingency. The new attachments are adaptable to any Works. Cost only that of rough castings. No lute used, and no leakage at lids. Half the number of lids only needed. Capacity of mains greatly increased. In new Works no mains. No carbon in retorts, seldom in stand-pipes. Address

CHARLES HUBBARD, JR.,
60 Vesey Street, N. Y.

286an1

OHIO GAS CANNEL,
From the Sterling Colliery.

I am now prepared to place in the market, through my agencies as below, a regular and unlimited supply of this valuable Cannel, for gas purposes. A recent analysis, by Prof. WURTZ, Editor of this Journal, at the Laboratories of the NEW YORK GAS-LIGHT COMPANY, gave 47½ per cent of Volatile Matter and 45 bushels to the ton of a fair quality of coke. The yield of gas was at the rate of 9,500 feet per ton of about 27 candle power. It is not highly sulphurous, can be purified by Lime, and the ash from the coke does not clinker.

GEORGE R. TUTTLE, Proprietor,
Cleveland, Ohio.

GENERAL AGENCIES.

George Merryweather, 5½ Pine Street, N. Y.

252

ATLANTIC DOCK
Iron & Machine Works,
FERRIS, WOLCOTT AND DYKEMAN STREETS,
South Brooklyn.

HOY, KENNEDY & CO., AGENTS.

Office 98 Liberty Street. P. O. Box 2,348

HOY, KENNEDY & CO.,
ENGINEERS AND CONTRACTORS

For the Erection or Extension of Gas Works.
PLANS, SPECIFICATIONS AND ESTIMATES.

MANUFACTURERS of every kind of Gas Machinery, Retorts Bench Castings, Wrought Iron Work, Multitubular and Air Condensers, Washers, Scrubbers, Purifiers, Exhausters with every equipment complete for large or small Works, Gasholders, Telescopic or Single; Iron Roof Frames with Cornice Gutters, covered with Corrugated Iron or Slate; Iron Doors and Iron Pivot Blind Windows; Coke Barrows, Fire Tools, Retort Lids, Cotter Bars and Screws, Stop Valves, Tar Valves for Regulating Dip in Hydraulic Mains, Pressure Governors for Street Mains, and Compensators for Exhausters that are unrivalled for unvarying accuracy Steam Engines, Boilers, Etc., Etc.

Agents for G. W. EDGE'S PROCESS for removing Carbon from Retorts.

Post Office Box 2,348. Office 98 Liberty st

CAUTION.

SEVERAL CONTRIVANCES HAVING BEEN DEVISED for the purpose of dispensing with the dip-pipe seal, by means of a valve, or cut-off, between the retort and the hydraulic main, in gas works, since this method of making gas was introduced by the AMERICAN COAL GAS LIGHT IMPROVEMENT COMPANY, all of which are infringements upon Letters Patent, numbered 95,459—116,450—and 119,135, owned by said Company. All Gas-Light Companies are cautioned against the use, without license or authority from the undersigned, of said devices.

The Am. Coal Gas Light Improvement Co.
JOHN H. BLAKE, President.
79 WATER STREET, BOSTON. 41 PINE STREET, NEW YORK

JOHN McNEAL & SONS,
MANUFACTURERS OF
Cast Iron Gas and Water Pipe.
Works—Burlington, N. J.
Office—117 Broadway, N. Y.

Having withdrawn from the firm of R. D. WOOD & Co., the practical management of which we have had since the organization of that firm until June 1871, we have now completed our Works for the manufacture of CAST IRON PIPE and Castings generally.

Having immediate rail and water communication with New York and Philadelphia, as well as the coal and iron regions, we have every advantage of situation.

Our experience in the manufacture of Pipe for a great many years, has enabled us in rebuilding to practically apply Machinery and Fixtures of the very best character, to insure *good work.*

We are now prepared to contract for this class of Castings under the most favorable terms.

We have associated with us Mr. H. G. H. TARR, formerly with R. D. WOOD & Co., who will take charge of our sales department in New York. 262-1y

GEO. STACEY. HENRY RANSHAW. WM. STACE

GEO. STACEY & CO.,
MANUFACTURERS OF SINGLE AND TELESCOPIC
GAS-HOLDERS,
AND ALL KINDS OF
Cast and Wrought Iron Work
Used in the Erection of Gas and Coal Oil Works.

Foundry on MILL STREET; Nos. 33, 35, 37 and 39.
Office and Wrought Iron Works on RAMSAY STREET, Cincinnati, Ohio.

REFERENCE.

Cincinnati Gas-Light Co.	Baton Rouge, La., Gas Co.
Indianopolis Gas Co.	Saginaw, Mich., Gas Co.
Dayton, O., Gaslight Co.	Oshkosh, Wis., Gas Co.
Covington, Ky., Gas Co.	Peoria, Ill., Gas Co.
Springfield, O., Gas Co.	Quincy, Ill., Gas Co.
Terre Haute, Ind., Gas Co.	Champaign, Ills., Gas Co.
Madison, Ind., Gas Co.	Carlinville, Ill., Gas Co.
Kansas City, Mo., Gas Co.	Bowling Green, Ky., Gas Co
Topeka, Kansas, Gas Co.	Hamilton, Ohio, Gas Co.
Burlington, Iowa, Gas Co.	Vicksburg, Miss., Gas Co.
Nashville, Tenn., Gas Co.	Denver City, Cal., Gas Co.

R. T. Coverdale, Eng'r Cincinnati, and others.

SPECIAL NOTICE.

PARTIES WRITING TO THE UNDERSIGNED ON GAS Matters, will please address J. B. CHICHESTER,
Engineer, Bayonne and Greenville Gas-Light Co.
303-6m Bergen Point N

KEYSTONE IRON WORKS,

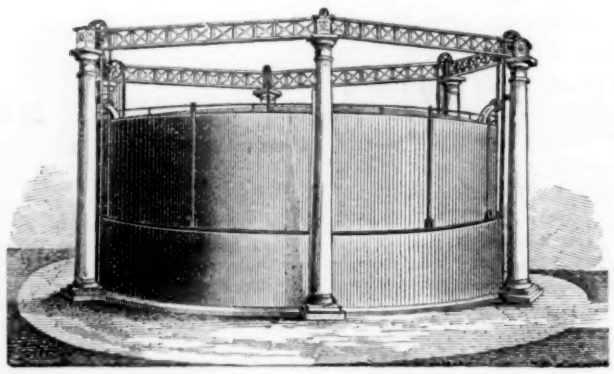
2132 FILBERT STREET, Philadelphia,

G. W. KRAFT, Proprietor,

MANUFACTURES

GASOMETERS.

COAL CARS, PURIFYING BOXES, COKE BARROWS.



RETORT HOUSE ROOFS, WATER TANKS.

Wrought Iron Work for Bridges, Buildings, Steam Boilers, Tanks, Stills, &c.

Particular Attention paid to Alterations and Repairs.

PROVIDENCE

Steam & Gas Pipe Co.,

PROVIDENCE, R. I.,

BUILDERS OF

Coal and Rosin Gas Works,

FOR TOWNS AND MANUFACTORIES.

Estimates furnished of the cost of Works, and cost to Manufacture Gas in any Locality.

Gasholders,

Iron Truss Retort House Roofs,

Water Tanks,

Purifier Covers,

Coke Barrows,

Cast Iron Socket Pipe.

Particular attention given to Enlarging and Re-building Gas Works.

For Lighting Manufactories, our Rosin Gas Works have been successfully used for *many years* past. They require but small outlay, and afford a *safe* and *economical* light.

FOR SALE AT MANUFACTURERS PRICES:

EXHAUSTERS AND COMPENSATORS,
IRON AND CLAY RETORTS,
FIRE BRICK, CLAY AND TILE,
ROMAN CEMENT AND ROSIN,
STATION AND CONSUMERS' METERS.

REFER TO

Manufacturers' Gas Co., Fall River, Mass.; Youngstown Ohio, Gas Co.; New Rochelle, N. Y., Gas Co.; Homer and Cortland, N. Y. Gas Co.; Danbury, Conn., Gas Co.; North Bridgewater, Mass., Gas Co.; Cold Spring, N. Y., Gas Co., Rockville, Conn., Gas Co.; Taunton, Mass., Gas Co.; Pawtucket, R. I., Gas Co.

Frederick Grinnell, President, J. C. Hartshorn, Treas, S. Millett Thompson, Secretary.

Office and Manufactory, corner of Pine and Eddy Streets, Providence, Rhode Island.

Office in Syracuse, N. Y., No. 1 Granger Block.

H. A. BRANCH, Agent.

MITCHELL, VANCE & CO.,

Manufacturers of

CHANDELIERS!

And Every Description of

GAS FIXTURES,

Also Manufacturers of

Fine Gilt, Bronze and Marble Clocks, warranted best Timekeepers, Mantle Ornaments, &c.

Salesroom, 597 BROADWAY,

Rear Entrance 140 Mercer Street,)

NEW YORK.

Special designs furnished for Gas Fixtures for Churches Public Halls, Lodges, &c.

Smith & Ellis,

IRON FOUNDRY & PIPE WORKS,

Philadelphia.

SEVERAL THOUSAND 3, 4, AND 6 INCH CAST IRON GAS PIPES OH HAND, FOR IMMEDIATE DELIVERY.

☞ GAS WORKS CASTINGS OF ALL KINDS.

291-6m

P. P. DEILY, J. FOWLER.

DEILY & FOWLER,

39 LAUREL STREET, PHILADELPHIA, PENN.,

BUILDERS OF

GAS WORKS.

MANUFACTURERS OF

GAS-HOLDERS,

WROUGHT IRON ROOFS,
CHARGING-SCOOPS, COAL WAGONS,
COKE BARROWS, AND ALL WROUGHT
WORK CONNECTED WITH GAS-WORKS.

Particular attention paid to the Extension of Works and Repairs to Gasholders, Purifiers, Etc.; also, Builders of Water Tanks, Oil Stills, Etc.

REFER TO

M. H. Jones, Easton Gas Co., Penn.
Franklin Woolman, Burlington Gas Co., N. J.
O. W. Goodwin, Camden Gas Co., N. J.
Benjamin Acton, Salem Gas Co., N. J.
D. H. Smith, Watkins Gas Co., Watkins, N. Y.
W. F. Warner, Oswego Gas Co., N. Y.
E. Wilcox, Joliet Gas Co., Ill.
Messrs. Woodbury, Walter & Potter, Kalamazoo Gas Co., Michigan.
H. H. Fish, Utica Gas Co., N. Y.
W. J. Ball, Terre Haute, Indiana.

(TO BE PUBLISHED SHORTLY.)

"A SYNOPSIS OF BRITISH GAS-LIGHTING,"

900 *pages, large 4to, profusely illustrated.*

This is the only compend of Gas-Lighting ever projected, and will be the standard work of reference among Companies, Manufactures, Engineers, Patentees, and Scientific Men generally.

Price $15, payable on delivery.

It will be sold only by subscription, which should be addressed to the compiler, JAMES R. SMEDBERG, Consulting Engineer S. F. Gas Co., San Francisco, Cal., or Editors American Gas-Light Journal, No. 42 Pine street, N. Y.

SABBATON'S PATENT Coke and Coal SCREENING SHOVELS.

MADE FROM BEST MALLEABLE IRON.

FURNISHED WITH LONG OR D HANDLES

Perfect in their operation. Very strong, and from their great durability vastly more economical than any substitute. Refer to all the principal Gas Companies in the country, who acknowledge them as the "ne plus ultra" of Coke Screening Shovels.

Orders addressed only to

O. R. BUTLER,
Sole Agent,
No. 96 Maiden Lane, N. Y.

OFFICE OF

THE GAS-LIGHT CO. OF AMERICA

C. K. GARRISON, President.
E. W. McGINNIS, Secretary and Treasurer.
JOHN P. KENNEDY, Chief Engineer.
LEONARD D. GALE, Consulting Chemist.

Gentlemen: We beg leave to inform you, that we have purchased the Patent process for making ILLUMINATING GAS from PETROLEUM and its products, known as the

Gale and Rand Patents,

and we are now prepared to treat with you for the use of said process by your Company.

We are also prepared to contract for putting said process into successful operation in your works, furnishing all the necessary plans, materials, and workmen for that purpose.

We do not deem it necessary to enter upon a detailed description, here, of the processes above referred to, deeming it sufficient to state, to secure your interest and investigation, that they have been in successful operation, for months, in a number of Gas-Light Works in the United States, and are now being introduced in the works of the Mutual Gas-Light Company, of New York City; the Citizens' Gas-Light Company, of Brooklyn; the New Orleans, San Francisco, and very many other Gas-Light Companies throughout the country.

For full particulars, address

THE GAS-LIGHT CO. OF AMERICA.

248-tf] **P. O. Box 5220, New York City.**

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.
Agents, PARMELEE BROTHERS, No. 32 Pine street, N. Y.

BANGS & HORTON, No. 31 Duane street, Boston.
Mines in Harrison County, West Virginia.
Wharves Locust Point, } Baltimore.
Company's Office, 29 South street, }

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested 264-1y

JOURNAL OF THE

FRANKLIN INSTITUTE.

Editor—Prof. W. H. Wahl, Ph.D.

ASSISTED BY THE COMMITTEE ON PUBLICATIONS.

This Journal, devoted to Mechanical and Physical Science Civil Engineering, and the Arts and Manufactures, published in monthly numbers of seventy-two pages each, forming two volumes per annum, illustrated with engravings and woodcuts.

The Journal is now in its forty-fifth year of publication, and has become a standard work of reference.

Terms of Subscription.—Five dollars per annum; payable on the issue of the sixth number. When the full subscription five dollars) is paid in advance, the numbers will be sent *free of postage*.

Communications and letters on business must be directed to the Actuary of the Franklin Institute, Philadelphia.

CHELTENHAM

Fire Brick and Clay Retort Works.

EVENS & HOWARD,

PROPRIETORS,

MANUFACTURERS OF

FIRE BRICK,

CLAY RETORTS,

GAS HOUSE TILE,

BLAST FURNACE TILE,

CHIMNEY TOPS,

SEWERAGE PIPE from 3 to 30 inch diameter,

SUPERIOR DRY MILLED FIRE CLAY, ETC

OFFICE, 916 MARKET STREET.

241-1y **St. Louis, Mo.**

Bird, Perkins & Job,

IMPORTERS OF

Pictou,

Sydney,

Lingan,

Caledonia,

Westmoreland and Newcastle

COAL,

ALSO,

Ince Hall, Scotch, and Red Bank Gas House Cannel.

103 STATE ST., Boston. 27 SOUTH ST., N. Y. [24

NATIONAL FOUNDRY

AND PIPE WORKS.

OFFICE AND WORKS—CARROLL, PIKE, SMALLMAN AND WILKINS STREETS,

PITTSBURGH, PA

WM. SMITH,

Manufacturer of all kinds of GAS and WATER PIPE BRANCHES, CONNECTIONS, T's, ELBOWS, and all CASTINGS USED AT GAS AND WATER WORKS,

We offer special inducements to parties wishing to purchase. My Pipe is Smooth, regular in weights, and cast vertically.

N. B.—Pipe from 3-inch and upwards, cast in 12-ft. lengths.

☞SEND FOR CIRCULAR AND PRICE LIST.☜

TYRCONNELL GAS COAL.,

MINED IN TAYLOR COUNTY, WEST VA.

Company's Office, 52 S. Gay St., Baltimore.

CHARLES MACKALL, Secretary.

CHARLES W. HAYS, Agent, Room 7, 111 B'way, N. Y.

SHIPPING POINT—Baltimore, Md.

This coal yields 10,000 cubic feet of Gas, with an illuminating power of over 16 candles. Forty bushels of verr superior Coke, with little Ash, and scarcely any clinker. 304-1y

CHARLES HUBBARD, JR.,

Consulting Engineer.

Steel and Iron Forgings, Light and Heavy Steel Castings to any pattern. Would call attention to his new article for Blacksmith's Forges, Jones's Patent Tuyere Iron, which is in successful operation in the leading establishments; can be used in any Forge now at work, or in combination with Jones's Improved Cast Iron Forge, plain or galvanized. Is prepared to furnish estimates of all kinds of Iron work used in the construction and carrying on of Gas Works, including supplies. Sole agents for A. L. Havens's Adjustable Automatic Dip Seal and Improved Retort Lids. Will give personal attention to the prompt execution of all orders. Address 60 Vesey Street, New York. 301

JAMES A. WHITNEY, late Editor of the *American Artisan*, and for four years past President of the New York Society of Practical Engineering, has opened an office as

Patent Agent, Expert in Patent Cases, and Mechanical Engineer,

AT NO. 128 BROADWAY, ROOM 11, NEW YORK CITY,

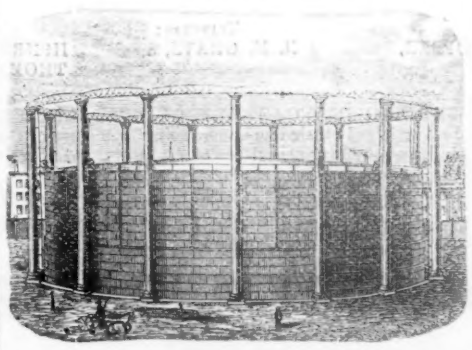
Mr. Whitney has had a practical experience of more than twelve years spent in pursuits directly connected with industrial operations and Patent Agency business, which will enable him to care for the interests of his patrons in the most satisfactory manner. 298

T. F. ROWLAND,

Continental Works,

GREENPOINT, BROOKLYN, N. Y.

ENGINEER, AND MANUFACTURERS OF



GAS-HOLDERS

OF ANY MAGNITUDE,

Condensers, Scrubbers, Purifiers, Retorts, Hydraulic Mains, and all other articles connected with the Manufacture and Distribution of Gas, furnished with despatch. Plans and Specifications prepared, and Proposals given for the necessary Plans for Lighting Cities, Towns, Mansions, and Manufactories.

B. S. BENSON & SON,

No. 112 BROADWAY, N. Y., ROOM 1.

MANUFACTURERS OF

CAST IRON GAS & WATER PIPE,

And Fittings for Gas & Water Mains, &c.

All sizes from 3 to 30 inches, cast vertically, in lengths of 12½ feet.

SCHOOL OF MINES,

COLUMBIA COLLEGE,

EAST 49th STREET, NEW YORK.

FACULTY:

F. A. P. BARNARD, S.T.D., LL.D., President.
T. EGLESTON, Jr., E.M., Mineralogy and Metallurgy.
FRANCIS L. VINTON, E.M., Mining Engineer.
C. F. CHANDLER, Ph. D., Analytical and Applied Chemistry.
JOHN TORREY, M.D., LL.D., Botany.
CHARLES A. JOY, Ph.D., General Chemistry.
WILLIAM G. PECK, LL.D., Mechanics.
JOHN H. VAN AMRINGE, A.M., Mathematics.
OGDEN N. ROOD, A.M., Physics.
JOHN S. NEWBERRY, M.D., Geology and Palæontology.

The plan of this School embraces a three years' course for the degree of Engineer of Mines, or Bachelor of Philosophy.

For admission, candidates for a degree must pass an examination in arithmetic, algebra, geometry and plain trigonometry. Persons not candidates for degrees are admitted without examination, and may pursue any or all of the subjects taught. For further information and for catalogue, apply to

252-1y DR. C. F. CHANDLER, Dean of the Faculty.

THE NEWBURGH

Orrel Coal Company,

Mines at Newburg, Preston County, W. Va.

Company's Office, No. 52 S. Gay Street, Baltimore, Md.

C. OLIVER O'DONNELL, Pres't. CHAS. MACKALL, Sec'y.

CHAS. W. HAYS, Agent in New York, Room 7, Trinity Building, 111 Broadway.

SINCLAIR & AGNEW, Agents, Alexandria, Va.

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York; the Brooklyn and Citizen's Gas Light Companies of Brooklyn, N. Y.; the Baltimore Gas Light Company of Baltimore, Md., and and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. 234-1y.

PLYMOUTH IRON WORKS.

MANUFACTURERS OF

Cast Iron Gas and Water Pipe,

FROM TWO INCHES TO SIX FEET DIAMETER.

HENRY G. NICHOLS,

SELLING AGENT.

14 PLATT STREET, N. Y. 291-6m

LUDLOW

Valve Manufacturing Co.

OFFICE 193 RIVER STREET, TROY, N. Y.

Make Valves—Double and Single Gate—¼ inch to 36 inch, for Water, Gas and Steam.

"CINCINNATI, March, 1870.

"I would say that if any certificate or affidavit is desired in relation to the superior character of the Ludlow Valve above others that I have seen, the same will be cheerfully given. I think, however, that the Valve proves for itself.

"JOSEPH MAYER,

"Superintendent Water Works.

"DAYTON, OHIO, June 27, 1870.

"I have to say that we find them always in order—operating easily under all degrees of pressure. In a words they have given perfect satisfaction in every particular.

"GEORGE LEHMAN,

"Chairman Water Works Committee.

"CANTON, OHIO, June 27, 1870.

"We are now using and have been, since the commencement of our works, your valves, and they are proving entirely satisfactory.

"JOHN S. SHORB,

"Superintendent Water Works."

"PEORIA WATER WORKS, July 1870.

"With pleasure I can testify to their superiority. The action has been perfect under all degrees of pressure, and have given perfect satisfaction.

"S. A. KINSEY, Ex. Sup't.

"JOHN J. STEIGER, Sup't.

"BROOKLYN GAS LIGHT COMPANY

"I take great pleasure in saying that they give perfect satisfaction—opening easily and quickly, and requiring no effort to start them; even after they have been closed for month

"A. F. HAVENS, Engineer."

"OFFICE OF PHILADELPHIA GAS WORKS, 14th June, 1870.

"I am pleased to state that the lot of large Gas Valves bought from you (Hart & Buck), as agents of the Ludlow Manufacturing Co., have given me perfect satisfaction. The double gate water valve, bought for a special purpose, also works admirably. We want no better valves. The Indicator on your valves is a great improvement over the old style.

"THOS. R. BROWN, Engineer."

MURRAY & BAKER,

Practical Builders,

And Contractors for the Erection of Gas Works,

MANUFACTURERS OF ALL THE LATEST AND MOST IMPROVED APPARATUS AND TOOLS FOR THE MANUFACTURE & DISTRIBUTION OF COAL GAS.

☞ WORKS AT THE RAILWAY DEPOTS,

FORT WAYNE, INDIANA.

We manufacture Bench Castings, Washers, "The Immersed Multitubular," and Atmospheric Condensers, Wet and Dry-Lime Purifiers, Dry Center Seals, Telescopic and Single Gas Holders, Wrought Iron Trussed Roof for Iron or Slate, Wood and Iron Trays for Purifiers, Coke and Coal Carts, Wrought Iron Screening Shovels and Castings, and Wrought Work of every description for Gas-Works.

As Mr. Murray is a Practical Draughtsman, we will furnish plans and specifications to parties or associations, or will wait personally upon parties contemplating the construction of new works, or the alteration or extension of old ones.

The most satisfactory references can be given, if required, of the experience and commercial fairness which characterizes our dealings.

We would respectfully invite Western men to call and see our patterns and works here. MURRAY & BAKER,

198-1y Fort Wayne, Indiana.

THE AMERICAN METER COMPANY.

Organized under the General Manufacturing Laws of the State of New-York.

SAMUEL DOWN, President. HENRY CARTWRIGHT, Vice-President. THOMAS J. EARLE, Secretary.

Trustees:

SAMUEL DOWN WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, Superintendent at Philadelphia.

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all articles in their line appertaining to the use of Gas Works.

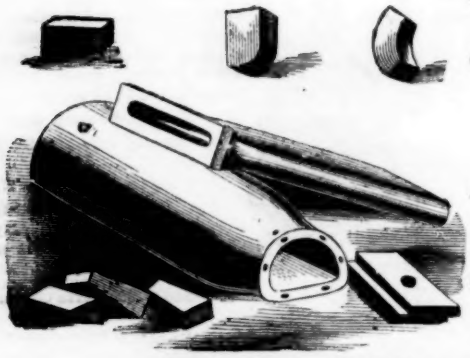
The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of Workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty-Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. 321 Washington Street, Boston, will meet with prompt attention.

BALTIMORE RETORT AND FIRE BRICK WORKS.

GEO. C. HICKS & CO.



CLAY RETORTS FOR GAS WORKS AND SUGAR REFINERIES.

TILES AND BLOCKS OF ALL KINDS.

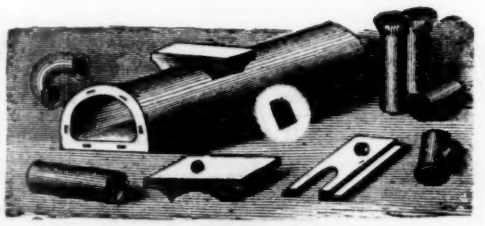
FIRE BRICK.

FIRE MORTAR, CLAY AND SAND.

ALL KINDS OF FIRE CLAY MATERIALS.

The Only XX Fire Brick.

☞ RETORTS OF THE VARIOUS SIZES KEPT ON HAND.



Vitrified Steam Pressed Drain and Sewer Pipe.

HARRIS & BROTHER,

ESTABLISHED 1848.

PRACTICAL GAS METER MANUFACTURERS,

Continue as heretofore at the OLD ESTABLISHMENT, Nos. 1115 and 1117 Cherry Street, Philadelphia, Pa.,

To manufacture Wet and Dry Gas Meters, Station Meters, Experimental Meters, Meter Provers, Centre Seals, Governors, Pressure Registers, Indicators, Photometers, and all kinds of Gas Apparatus; Also furnish all other Articles appertaining to the use of Gas Works.

From our long Practical Experience of the Business (covering a period of 20 years) and from our personal supervision of all Work, we can guarantee all orders to be executed promptly, and in every respect satisfactorily.

J. Wesley Harris, Washington Harris, Wm. Wallace Goodwin.

GAS PURIFICATION.

St. John and Cartwright's NEW IRON COMPOSITION

Has purified, per bushel, on a single test, 10,000 feet of Westmoreland Gas. With revivification lasts indefinitely. Surpasses in POWER and ECONOMY all known materials. Saves largely in FIRST COST, SPACE, LABOR, SUPERINTENDENCE, and all current expenses. Will purify *easily* sulphurous gas, wholly *unmanageable by lime*. Takes out *all the ammonia*. Now operating in the following Gas Works: Harlem, New York (21st street); Port Morris; Hunter's Point; East New York; Worcester, Lynn and Cambridge, Mass.; Lewiston, Maine; St, Albans, Vt.; Pawtucket, R. I.; Meriden, Ct., and being introduced in many other places.

Cost 70 cents per bushel. One bushel for each square foot of Purifier sufficient. Rights to use for life of Patents, for daily makes of gas in thousands; under 25,000 $200; under 50,000, $400; under 100,000, $500; $250 additional for each additional 50,000 per day.

For further information and instructions, apply to

ST. JOHN & CARTWRIGHT,
21st Street and Avenue A, New York Gas Works.

☞ Immediate arrangements are urged, as the demand for the prepared composition is increasing *so rapidly* that delays supply may occur.

C. GEFRORER,

Manufacturer of

GAS BURNERS,

GAS HEATING AND COOKING APPARATUS,

FITTERS' PROVING APPARATUS. ETC.,

No. 248 North Eighth Street, Philadelphia.

RILEY A. BRICK & CO.,

MANUFACTURERS OF

CAST IRON PIPES,

FOR WATER AND GAS,

ALSO,

GAS WORKS & MACHINERY CASTINGS

OF EVERY DELCRIPTION,

No. 89 White Street, New York.

Riley A. Brick. Jas L. Robertson.

B. S. BENSON.

MANUFACTURER OF

Cast Iron Pipes and Fittings,

AND

Gas and Water Mains.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths

Office & Factory 52 East Monument St.,

BALTIMORE, MD.

SITUATION WANTED BY A COMPETENT AND energetic Gas Engineer, as Superintendent of Gas Works. Has had many years experience, and is thoroughly conversant with the management of gas accounts. Can produce testimonials as to capability. Address C. E. S., office of this Journal 305

R. D. WOOD & CO.,

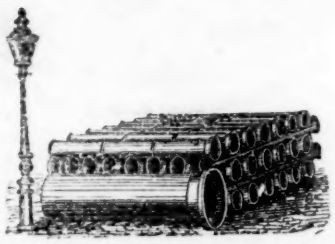
PHILADELPHIA.

MANUFACTURERS OF

CAST IRON GAS & WATER PIPES,

Matthews Patent Hydrants,

Lamp Posts, Etc.



For the accommodation of parties who may want small lots Pipe for *immediate* delivery, we have established a yard in New York City.

We have on hand here several thousand feet of small Pipe rom which we can ship orders readily to any part of the country.

R. PAINE, Selling Agent,

No. 173 Broadway, New York,

3-tf SECOND FLOOR.

GLOUCESTER IRON WORKS.

GLOUCESTER CITY, NEW JERSEY.

DAVID S. BROWN, Pres't. JAMES P. MICHELLON, Sec'y.

BENJ. CHEW, Treas. WILLIAM SEXTON, Sup't.

OFFICE, PHILADELPHIA,

No. 6 North Seventh St., (west side.)

—oo—

CAST IRON GAS AND WATER PIPE

PIPE CAST VERTICAL.

1½ to 48 inches diameter.

Cast Iron Flange Heating and Steam Pipe.

STOP VALVES FOR WATER OR GAS, ALL SIZES.

Fire Hydrants,

GAS HOLDERS,

TELESCOPIC OR SINGLE.

☞ Castings and Wrought Iron Work of all kinds for Gas Works. 253-6m

S. FULTON & CO.,

PLYMOUTH IRON WORKS,

CONSHOCKEN, PA.,

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heay and Light Castings of every description.

412 Walnut street, Philadelphia, Pa.

SAMUEL FULTON, THEO. TREWENDT

AMERICAN JOURNAL OF SCIENCE & ARTS,

FOUNDED BY PROF. SILLIMAN IN 1818,

And now numbering 100 volumes, in two Series of 50 vols. each.

Editors and Proprietors: Profs. Silliman and Dana.

Associate Editors: Profs. Gray and Gibbs of Cambridge, and Newton, Johnson, Brush and Verrill of Yale.

Devoted to Chemistry, Physics, Geology, Mineralogy, Natural History, Astronomy, Meteorology, etc.

A Third Series in MONTHLY numbers, making two volumes a year of about 450 pages each, from January, 1871. Subscription price $6.00 a year, or 50 cents a number.

A few complete sets on sale of the first and second series.

Address, **SILLIMAN & DANA,** New Haven, Ct.

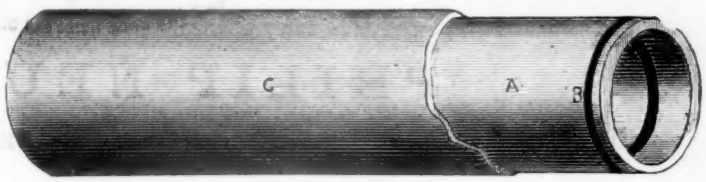
NORTHWESTERN GAS AND WATER PIPE COMPANY.

—oo—

WORKS, AT BAY CITY, MICHIGAN.

CHICAGO OFFICE, 646 WABASH AVENUE.

SECTION OF GAS PIPE.



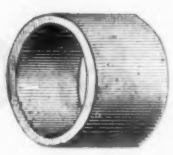


FIG. 2.

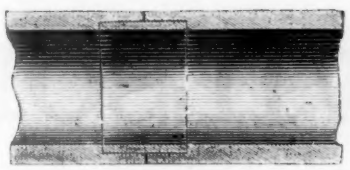


FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3—Horizontal Section and Connection.

Above is a cut of the

"WYCKOFF PATENT IMPERISHABLE GAS PIPE,"

manufactured by the NORTHWESTERN GAS AND WATER PIPE COMPANY.

This Pipe is made of White Pine, one inch to sixteen inches bore, in sections eight feet long, rounded in a lathe, coated inside and out with Asphaltum, connected with a tenon, or socket, and a thimble joint, perfectly air and water tight, being driven together with cement furnished by the Company. When laid its cost is about one half that of Iron Pipe, and is UNQUESTIONABLY the best Gas conducting Main in use.

☞ Send for Descriptive Pamphlet and Price List. 242-1y

DENNIS LONG & CO.,

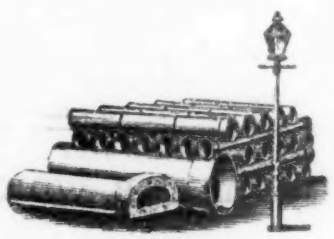
Union Pipe Works,

Louisville Pipe Foundry,

AND

Union Foundry and Machine Shops,

LOUISVILLE, KY.



MANUFACTURE

Cast Iron Gas and Water Pipe,

All Pipe cast vertically in dry sand.

2 inch Pipes in 8 feet lengths. 3 inch to 60 inch cast in 12 feet lengths.

RETORTS AND MOUTH PIECES, LAMP POSTS, CONDENSING PIPE, HYDRAULIC MAINS, PURIFIERS, DRIPS, ELBOWS, T'S, CROSSES, SLEEVES, VALVES, &c., &c.

GAS-HOLDERS.

And every description of work necessary for Gas or Water Companies.

JESSE W STARR & SONS,

Camden Iron Works

Camden, New Jersey,

MANUFACTURERS OF

ALL KINDS OF CASTINGS AND APPARATUS FOR GAS WORKS,

Wrought Iron Roof Frames,

For Retort and other houses. Retorts and all castings required for setting them in the latest and most improved model. WASHERS, CONDENSERS, SCRUBBERS and EXHAUSTERS, for relieving the Retorts from pressure. PURIFIERS, varying from 2,000 to 2,000,000 cubic feet daily purifying capacity.

Wrought Iron Lime Sieves,

for Purifiers. Station Meters of all sizes.

GAS HOLDERS,

TELESCOPIC AND SINGLE,

With cast iron guide and suspension frames. GAS GOVERNORS or REGULATORS, STREET MAINS, from 1¼ to 48 INCHES DIAMETER, for WATER or GAS. Street Main nnections, such as BRANCHES, BENDS, DRIPS, SIEVES, etc.

STOP VALVES, from 3 to 30 inches, for both Water and Gas.

Wrought Iron Work.

All the Smith and Sheet Iron work required in and abo Gas Works. 226-tf

JESSE W. STARR. BENJ. A. STARR. BENJ. F. ARCHER

THE
PHILADELPHIA &
KENSINGTON FIRE BRICK & CLAY
RETORT WORKS.
Kensington Fire Brick Works, Beach & Poplar Sts.
Philadelphia Fire Brick Works and Office, 23d & Vine Sts.
Philadelphia Clay Retort Works, St. David & Vine Sts.

PHILIP NEUKUMET,

(SUCCESSOR TO JOHN NEUKU MET),

Manufacturer of Fire Bricks, Tiles, Gas and Sugar House Retorts.

☞ Plans of Settings for Benches of Threes, Fives, and Sixes furnished, free of charge, upon application.

WILSON & GARDNER.

Works, Lockport, Westmoreland Co., Pa.

Office, 96½ Fourth Avenue, Pittsburgh, Pa., Rooms 1 and 2.

MANUFACTURERS OF

CLAY RETORTS, FIRE BRICK, TILE, Etc.

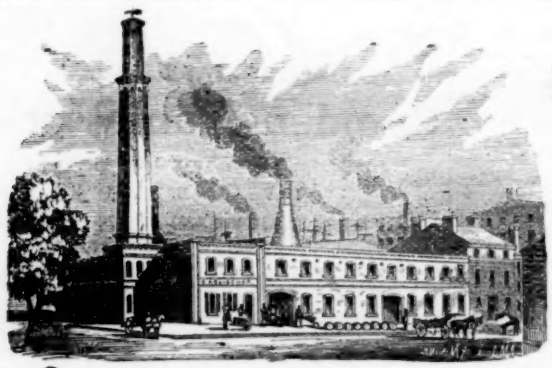
FROM CLAY, SAME SPECIES, AND EQUAL TO

BEST BELGIAN.

☞ ORDERS PROMPTLY FILLED. IMPROVED WORKING PLANS OF THREES AND FIVES UPON APPLICATION.

REFERENCES:

Gas Works Northwest, West, and South.



NEW YORK

FIRE BRICK AND CLAY

Retort Works.

☞ *Established in* 1845. ☜

(Branch works at Kreischerville, Staten Island.)

B. KREISCHER & SON,

OFFICE,

58 Goerck Street, cor. Delancy, N. Y.

GAS RETORTS, TILES & FIRE BRICK
Of all shapes and sizes.

FIRE MORTAR, CLAY AND SAND.

Articles of every description made to order at the shortest notice.

B. KREISCHER & SON.

MANHATTAN

FIRE BRICK & ENAMELLED CLAY

Retort Works.

MAURER & WEBER,

(Of the late firm of B. Kreischer & Co.,)

PROPRIETORS.

Office and Works, 15th Street, Avenue C.

Manufactures of

FIRE BRICK AND TILES,

Of all shapes and sizes.

FIRE MORTAR, CLAY AND SAND.

☞ Articles of every description made to order at short notice. (135

HY. MAURER. ADAM WEBER.

GRAHAMITE,

OR

RITCHIE MINERAL.

The yield of this Asphalt is nearly double, and the Candle Power more than double the product of Gas Coals, and it is extensively used by great and small companies, chiefly as an enricher and stimulant, in the proportion of five per cent. Yield 15,000 to 16,000 feet per gross ton. Illuminating power 30 to 32 candles. One bushel of lime purifies 6000 feet. Coke very strong. It is incapable of spontaneous combustion or caking in the heap, and is used by simple addition to the charge.

We sell at figures which allow a much larger profit to the purchaser, with better light than any standard coal.

No gas material is at once so safe and so cheap. Our Asphalt is used in the manufacture of Varnish, Roofing, Ship Paint, Tiles, Pavements, Water Proof Paper, Cloth, and for all purposes where a coating is required that is unaffected by Water, Gasses, Alkalies, or Acids.

The Ritchie Mineral Resin and Oil Co.

257 3m No 27 South Charles St., Baltimore, Md.

JERSEY CITY

GAS METER WORKS.

R. M. POTTER & CO.,

MANUFACTURERS OF

CONSUMERS GAS METERS, WET AND DRY,

Station Meters, Center Seals, Governors, Pressure Registers,

AND ALL KINDS OF PRESSURE GAUGES.

Experimental Meters and Standard Test Gasholders,

☞ And all apparatus in use at the Gas Works ☜

14 Morris St., Jersey City, N. J. (1y

LACLEDE FIRE BRICK

AND

Clay Retort Works,

Cheltenham, St. Louis Co., Mo.

Laclede Fire Brick Manufactnring Co.

Office, 901 Pine Street. Warehouse, 1007 N. Levee, St. Louis

NOW READY AND FOR SALE,

FODELL'S

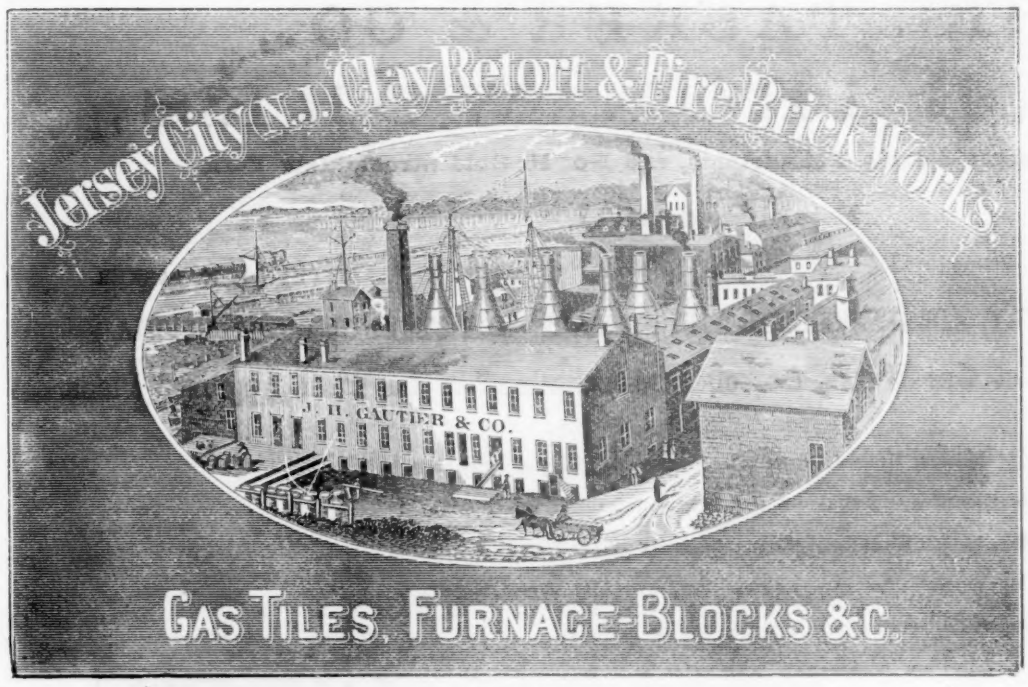
System of Bookkeeping

FOR GAS COMPANIES.

Price $5, which should be sent either in Check, P. O. Order, or Registered Letter.

Blank Books, with printed headings and forms on this system, will be supplied to Gas Companies, by applying to W. P FODELL, Philadelphia, or

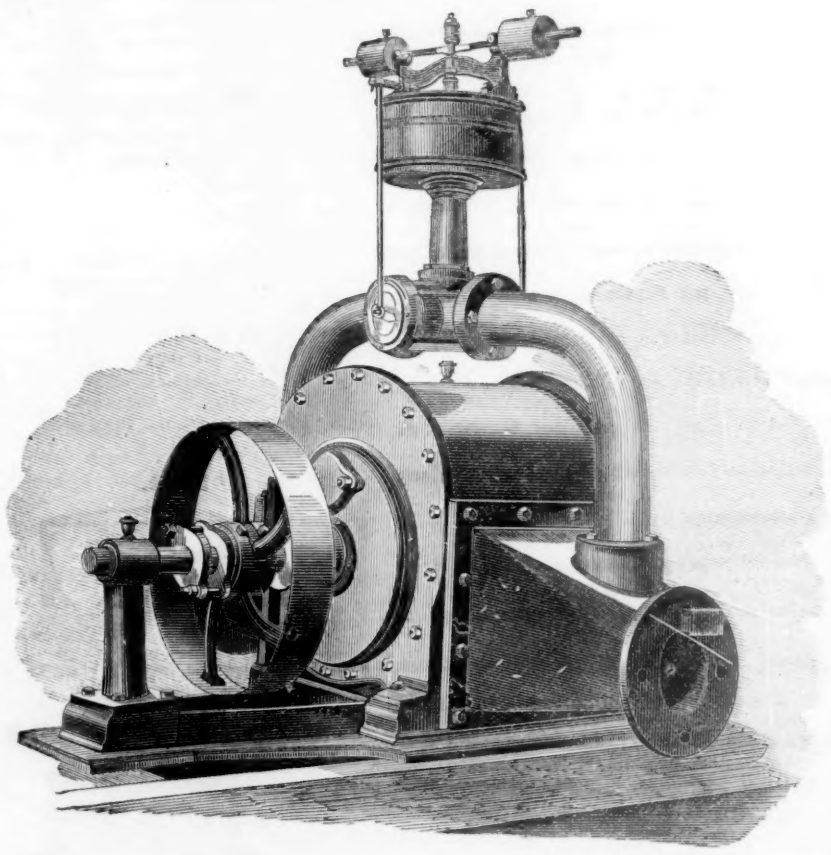
A. M. CALLENDER & CO.,
Office GAS-LIGHT JOURNAL, 42 Pine St., N.Y.



SMITH & SAYRE MANUFACTURING COMPANY.

The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

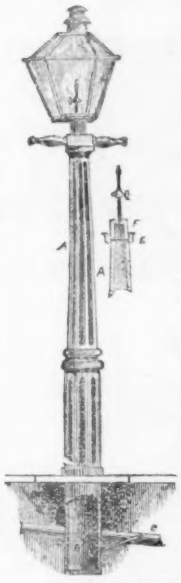
MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent fuel. Address

G. G. PORTER, President.
JAMES M. SAYRE, Treasurer.
CHARLES W. ISBELL, Secretary. OFFICE, 25 LIBERTY STREET, New York.

GRAHAM'S

Patent Anti-Freezing LAMP POST.



THE BEST, CHEAPEST AND MOST DURABLE POST EVER OFFERED TO THE PUBLIC.

WOOSTER, OHIO
Jan. 24, 1871.

J. W. GRAHAM,

Dear Sir: Yours of the 14th inst at hand. In reply I would say that we have tested the six anti-freezing Lamp Posts purchased from you, and find them to be all as you represented. Whilst nearly a dozen of our sixty-five Posts were frozen down last month and first of this not one of yours was affected by the heavy frost. What can you sell them at?

Yours truly,
LUCAS FLATTERY
Sec'y Wooster Gas-Light Co.

Address the Patentee,
J. W. GRAHAM,
250-9t Chillicothe, Ohio.

AGENCY FOR

GIBSON'S IMPROVEMENT

IN THE

Manufacture of Coal Gas,

41 PINE STREET, ROOM 1.

The undersigned having been appointed Special Agent for the introduction of GIBSON'S Substitute for Dip-Pipes in the Manufacture of Coal Gas, respectfully presents for the consideration of Gas-Light Companies the Circulars and Pamphlet issued by the American Coal Gas-Light Imp. Co., descriptive of the value of GIBSON'S Improvement, and the mode by which Gas-Light Companies can satisfy themselves of its usefulness, without trouble or expense, at their own works.

Orders for fitting up Valves of any desired form or patent, *subject to the generality of the Gibson claim*, and also for SUPPLIES and MATERIALS of every description required for the use of Gas Light Companies promptly attended to by

W. H. GRENELLE, Special Agent.

REFERENCE.—RICHARD MERRIFIELD, Esq., late Vice President MANHATTAN GAS-LIGHT COMPANY.

WORKS UPON GAS.

BOWDITCH.—THE ANALYSIS, TECHNICAL VALUATION, Purification, and Use of Coal Gas, with illustrations, 8vo. cloth. Price, $4.50.

THE GAS MANAGER'S HAND BOOK; consisting of Tables, Rules, and Useful Information for Gas Engineers, Managers, and others engaged in the Manufacture and Distribution of Coal Gas. By Thomas Newbigging; 8vo. cloth. $3.75.

BOWER—Gas Engineer's Book of Reference, illustrated, 4to. Price, 75c.

CLEGG—Treatise on the Manufacture of Coal Gas, 5th edition, enlarged, 4to, cloth. Price, $10.50.

COLBURN—The Gas Works of London, 12mo, boards. Price, 60 cents.

GAS CONSUMERS' GUIDE—A Hand Book of Instruction on the proper management and economical use of gas, etc., etc. 12mo., cloth. Price, $1.00.

HUGHES—Gas Works and Manufacturing Coal Gas, 12mo. Price, $1.20.

MASON—The Gasfitter's Guide, paper. Price, 50 cents.

D'HURCOURT—De l'Eclairage du Gas. Par E. R. Hurcourt, 3d edition. Paris, 1863; 8vo. and plates, $6.00.

RICHARD—Gas Consumer's Guide, 12mo. Price, 50 cents.

SWEET—Special Report on Coal, showing its Distribution, Classification, and Cost, delivered over different routes to various points in the State of New York, and the principal cities on the Atlantic Coast. By S. H. Sweet, with Geological Maps. 1 vol. 8vo. cloth, $3.

SUGG—Gas Manipulation, with a description of the various Instruments and Apparatus employed in the Analysis of Coal and Coal Gas, 8vo., cloth. *Scarce.*

WILKINS—How to Manage Gas; 24mo., paper. Price, 25c.

SCHILLING—Traite d'Eclairage par le Gaz. Price, $22.

For sale by

D. VAN NOSTRAND, Publisher,
23 Murray Street and 27 Warren Street
(Upstairs).

☞ Our new and revised Catalogue of American and Foreign Scientific Books, 80 p. 8vo., sent to any address, on receipt of ten cents in postage stamps. 228

MORRIS, TASKER & CO.,

PASCAL IRON WORKS,

Corner Fifth and Tasker Streets, Philadelphia, and No. 15 Gold Street, New York.

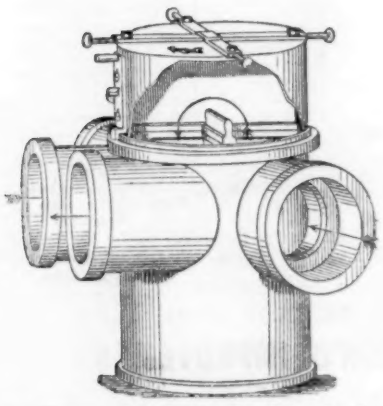
Established 1821,

THOMAS T. TASKER, Jr., STEPHEN P. M. TASKER.

FOR GAS WORKS MACHINERY, ADDRESS CORNER FIFTH AND TASKER STREETS, PHILADELPHIA.

Manufacturers and Builders of Gas Works, &c., of all Descriptions, of the Most Approved Plans.

No. 1.



By Pass with Drip for Single Apparatus.

Messrs. Morris, Tasker & Co., respectfully ask the attention of Gas Engineers and others, interested in the erection of Gas Works and the manufacture of Gas for illuminating purposes, to their new and improved By-Passes, which are made from entirely new and original designs.

They are constructed with water seal compartments to pass the gas through the required channels without leakage; with drip chambers to catch the water of condensation, tar, and ammoniacal liquor; and also with a loose or circular valve, to control the direction of the gas flow.

The By-Passes shown in the annexed illustrations, are similar in construction and varied in size to suit works of different capacity

No. 1 is a By-Pass for Gas Works of small generating power, and using but a single apparatus; the gas from the retorts enters the proper nozzle, as shown by the arrow, and being deflected by the diaphragm of the valve over one of the vertical partitions of the drip chambers, it passes through one of the nozzles to the meter and returns to be again deflected by the rotary valve to the gas holder.

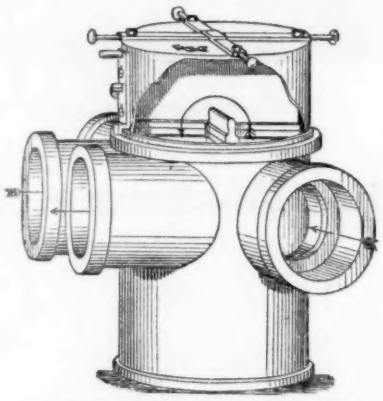
No. 2 is a By-Pass for using two apparatus, the gas is entered and the direction of its current is controlled similarly to that of No. 1, just described.

No. 3 is a By-Pass for passing the gas around the meter or not, according to the set of the loose or circular valve.

No. 4 is a sectional view of No. 3, and fully illustrates the construction and arrangement of the various By-Passes; the vertical partitions P are placed at right angles and divide the By-Pass into four drip chambers, they extend to within a short distance of the bottom to allow the water W, which forms the water seal, to circulate freely; the valve V is constructed with a diaphragm which divides it diametrically, the edges from ground joints with the upper edges of the partitions P, to prevent the gas from leaking from one chamber to another, and also to protect the ground surfaces from the corrosive action of the gas.

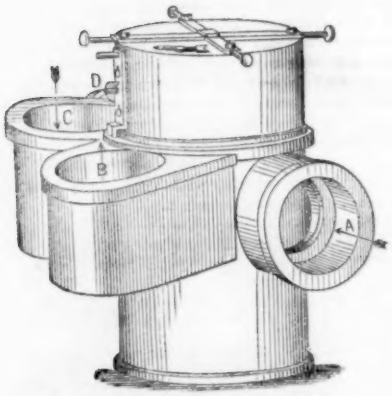
No. 5 is a single By-Pass with Drip Chambers.

No. 2.



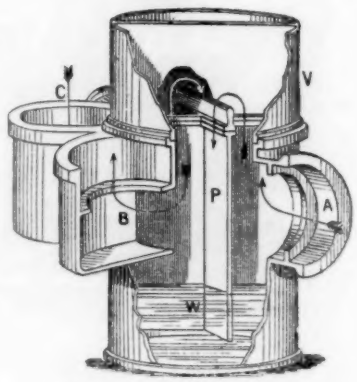
By Pass with Drips for two Apparatus.

No. 3.



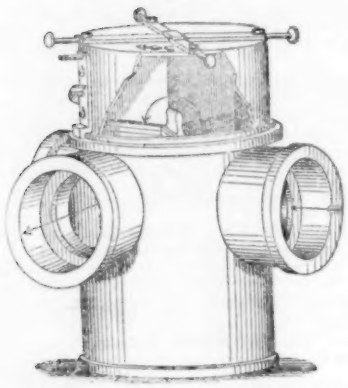
Meter By Pass with Drip.

No. 4.



Section of No. 3.

No. 5.



Single By Pass with Drip.